A CHILTON PUBLICATION

the Iron Age

NATIONAL METALWORKING WEEKLY

May 21, 1953

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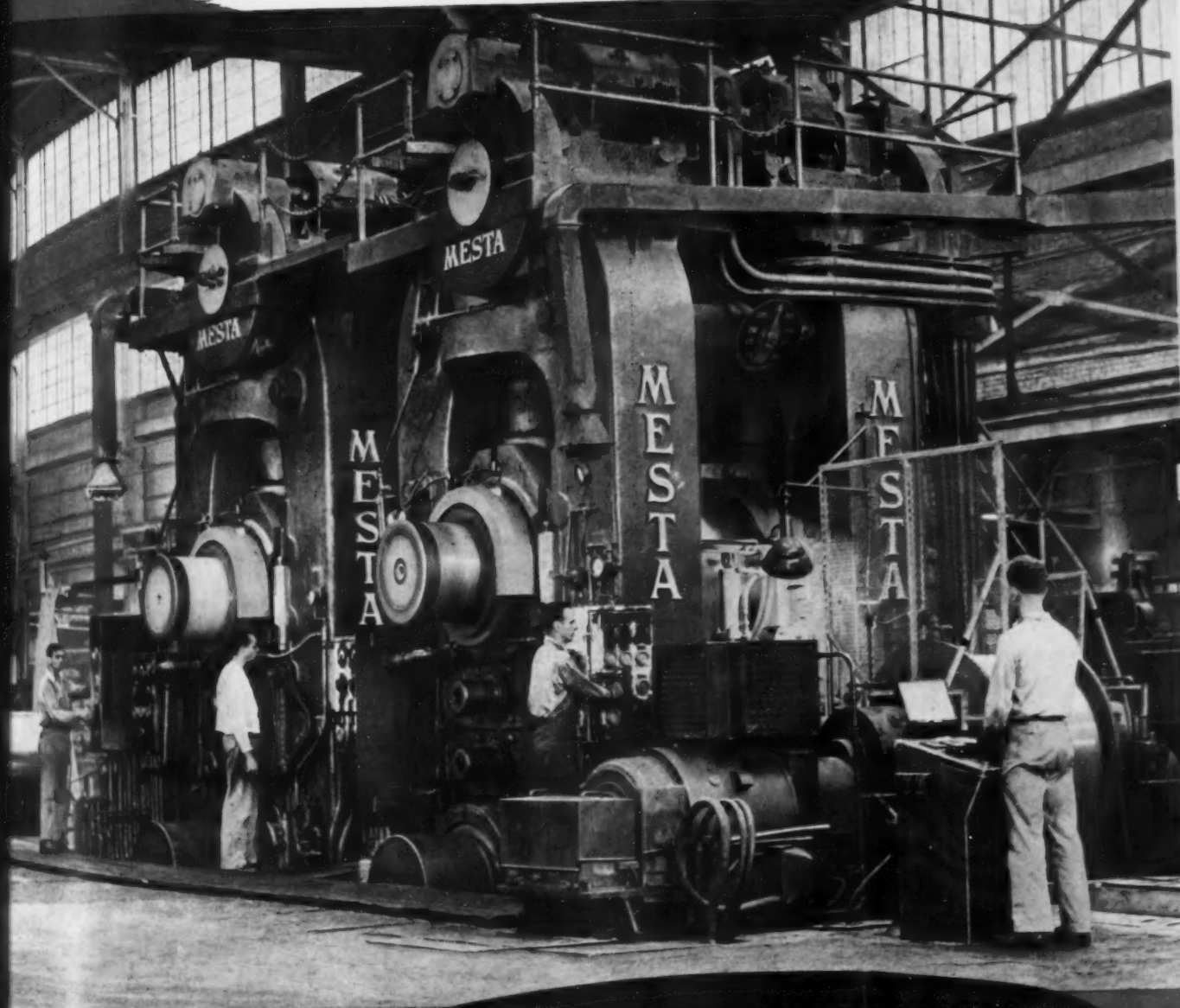
NTS PAGE 2

MESTA
HIGH-SPEED COLD MILLS



ESTA 42" FOUR-HIGH TWIN-STAND
IGH-SPEED SKIN PASS MILL.

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

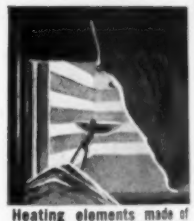
How Hot can a Jet Get?

Whoooosshh! Jet engines generate a powerful amount of heat . . . heat which, uncontrolled in flight, would cause disastrous metallurgical distortions within the delicately balanced engine. So the problem is . . . or rather *was* . . . how to provide a dependably accurate means of measuring exhaust temperatures so that the pilot might have control over how hot his jets get.

And the answer? Special wiring harnesses running from engine to instrument panel . . . harnesses now made exclusively with Hoskins Chromel-Alumel thermocouple alloys.

Yes, wherever durability and accuracy are required in a thermocouple . . . whether for jet engines or industrial furnaces . . . you'll find Chromel-Alumel *right* for the job. Extremely durable . . . highly resistant to heat, corrosion, oxidation . . . guaranteed to register true temperature-E.M.F. values within specified close limits.

That's only part of Hoskins' product picture, though. Other specialized quality-controlled alloys developed and produced by Hoskins include: Alloy 785 for brazing belts; Alloy 717 for facing engine valves; special alloys for spark plug electrodes; Alloy 502 for heat resistant mechanical applications. And, of course, there's Hoskins CHROMEL . . . the *original* nickel-chromium resistance alloy used as heating elements and cold resistors in countless different products.



Heating elements made of Hoskins Chromel deliver full-rated power throughout their long and useful life.

Sparks fly better, last longer in today's spark plugs . . . thanks to Hoskins' spark plug electrode alloys.

Hot stuff for hot jobs! Hoskins Alloy 502 is ideally suited to many mechanical-structural applications.

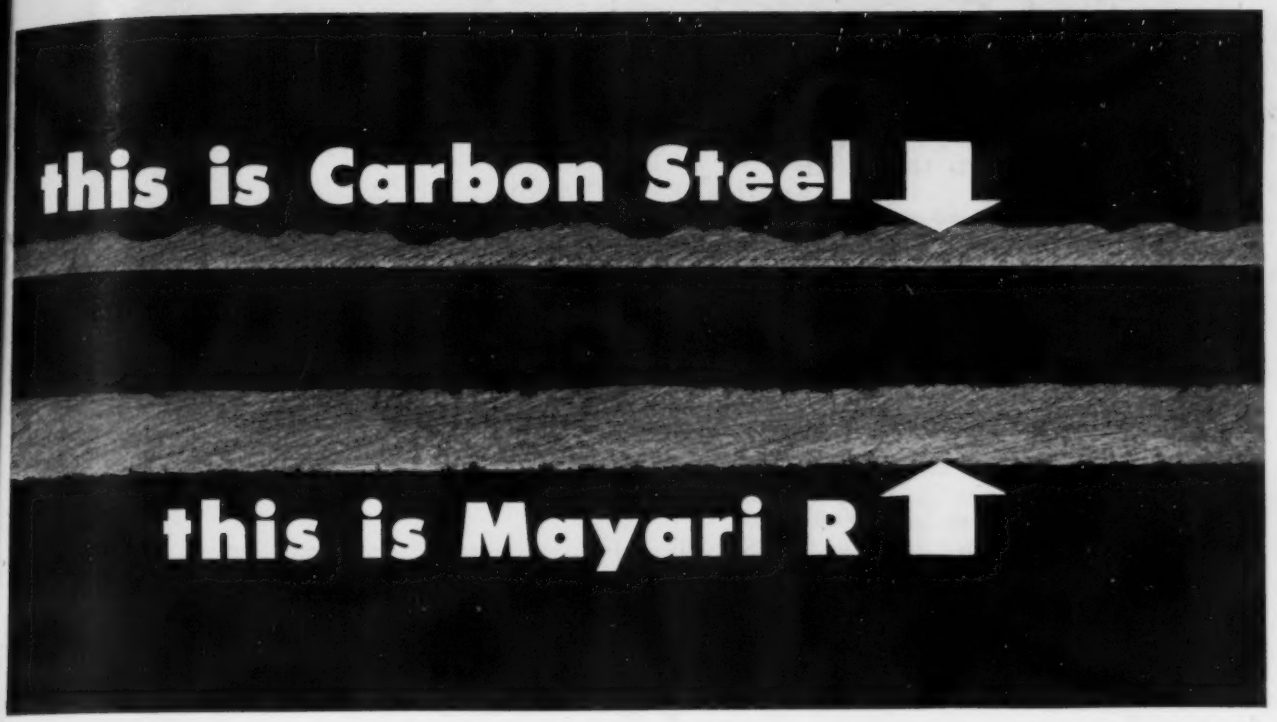
Chromel® NICKEL CHROMIUM WIRE

HOSKINS

MANUFACTURING COMPANY

4445 LAWTON AVENUE, DETROIT 2, MICHIGAN

after 5 years' exposure



The upper portion of this unretouched photograph shows a cross-section of a carbon steel sheet, and the lower portion shows a Mayari R sheet, after identical exposure. Both sheets were of the same thickness when originally exposed to the atmosphere. The photograph is approximately 4 times actual size.

Mayari R, Bethlehem's low-alloy, high-strength steel, has 5 to 6 times more resistance to atmospheric corrosion than plain carbon steel . . . and 2 to 4 times as much as copper-bearing steel.

These figures are the findings of extensive tests conducted in different types of atmosphere. They have been confirmed in practice by applications that range from railway hopper cars to pole line hardware.

Here's the reason why Mayari R has such excellent corrosion-resistance. When it is exposed, a thin, tight layer of rust forms on the surface to act as a protective coating. This rust does not flake off in the manner of carbon-steel rust. Instead, it holds securely to the surface and retards any further corrosive action.

Another interesting feature of Mayari R is its superior ability to retain paint. Tests show that primer paint will last 20 to 80 pct longer on Mayari R than on carbon steel, depending upon the type of primer used.

Mayari R has other advantages, including higher yield-point and greater tensile-strength than are found in ordinary steel. These features contribute to longer life, lower maintenance and improved design of equipment and structures.

For more information about Mayari R, its properties and its recommended applications, call or write any of our sales offices and ask for a copy of Catalog 259.

Surface views of the same test specimens as shown in the upper photograph. After 5 years' exposure the Mayari R (right) is relatively smooth while the carbon steel (left) is rough and deeply pitted.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Mayari R *makes it lighter... stronger... longer lasting*

The Iron Age

Vol. 171, No. 21, May 21, 1953

* Starred items are digested at the right.

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DIGEST of the

NEWS DEVELOPMENTS

FIRE CAN SEND YOUR PROFITS UP IN SMOKE—P. 71
Nobody is sure of exactly how it started but last month's fire in Chicago left a count of 34 dead and 29 hospitalized. Industrial blazes cost $172,750,000 in 1951. Over $39 million worth of property was destroyed in 1952 by 88 plant fires that cost over $250,000 each. Here are things to watch out for.

GOT ANY WORK FOR WHEELCHAIR MACHINIST?—P. 74
Unless industry gives Nick Bell some machining work to do, he will lose more faith in private enterprise. Nick's a paraplegic with a machine shop but he can't get any subcontracts to keep him busy. Nick won't believe America owes him a living but he feels betrayed that a man can't get work to do.

LIMESTONE: AN UNROMANTIC BUT VITAL ROCK—P. 78
Neglected in the drama of the steel industry ringing the Great Lakes is the part played by the vast limestone reserves of northern Michigan. They are among the world's best deposits of the iron fluxing agent and have played an important role in steel's growth in the area. Steelmakers start new quarries.

DO YOU TREAT YOUR FOREMAN LIKE AN EXEC?—P. 82
Most executives agree that for best results foremen should be part of management. But in many plants foremen are not treated as though they belong to the management group. Attitude of top executives and plant workers important in determining their effectiveness. Foremen's Institute tells what to do.

NPA ESTABLISHES STEEL DISTRIBUTION RULES—P. 84
National Production Authority has issued a set of rules regulating production and distribution of steel for military and atomic energy purposes. Controls will go into effect after CMP expires June 30. The new order reserves only the power to direct production and delivery of items needed for defense and atoms.

ST. LAWRENCE SEAWAY CHANCES RATED BEST—P. 93
Chances for approval of the St. Lawrence Seaway in 1953 are rated the best in 40 years. Three factors strengthen the odds. (1) Approval by President Eisenhower and the Cabinet, (2) tentative okay of New York State power plans, and (3) reaffirmation that Canada is not bluffing in its stand.

the Week in Metalworking

ENGINEERING & PRODUCTION

AUTOMATIC UNIT TOUGHENS TORSION BARS — P. 129
Torsion bars for military track-laying vehicles must be hard, strong, tough and straight. The bars acquire these characteristics in a hardening-quenching-tempering unit which treats them automatically. Constant sampling provides close quality control. Despite these rigid specifications, rejects are few.

NEW TYPE BLAST FURNACE NEARLY COMPLETE—P. 133
Built to utilize low-grade ore, this new furnace does not require metallurgical coke. It will make 60 to 100 tons of iron per day. Designed for maximum oxygen enrichment, it will consume about 45 tons of oxygen daily. The charge is blended into a homogeneous mixture. Oval shape believed best design.

DON'T OVERLOOK EXTRA MACHINE BENEFITS — P. 138
Fringe benefits of new machine-tool replacements often outweigh savings in direct labor. Overlook them and your chance for profit may go by the boards. Savings in floor space, less indirect labor, fewer operations and lower maintenance costs are key factors. Small scrap loss and low inventory also help.

BIG GEARS PRODUCED FASTER AND CHEAPER—P. 140
Gears up to 15 ft diam x 5 ft wide are now being made faster, with greater accuracy an dat lower cost. Revised production methods eliminate lapping. New vertical gear-shaving machines handle gears with machine diameters from 48 to 180 in. About 75 pct is saved in finishing time and 50 pct in production time.

HOW SCALING MAKES OR BREAKS METALS — P. 144
Three major types of oxidation reactions are compared. Tight, adherent oxide coatings are self-protective. Volatile, porous oxides are nonprotective. Different metals have different characteristics. Linear, parabolic and logarithmic oxidation curves show parabolic oxidation produces protective coatings.

NEXT WEEK—COLD TREATMENTS IMPROVE PRODUCTS
Cold treating of metal products aids fabrication in many ways: dimensional stabilization of precision parts, improved strength and accuracy of tools and machine parts, better machinability and improved metallurgical properties. Expansion fitting by refrigeration leaves no distortion or discoloration.

MARKETS & PRICES

STEELMAKERS ON LAST LAP OF EXTRA BOOSTS—P. 75
Steel producers have rounded the turn and are heading for the finish line in their revision of extras. Virtually everything has been covered, including tobacco hogshead hoop. Revisions undoubtedly mean that some manufacturers will have to raise prices. Latest steel extra increases are listed.

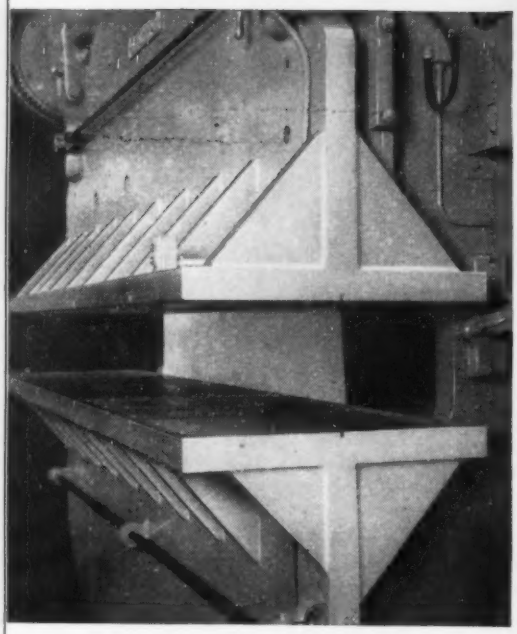
BUYERS RAISE LITTLE FUSS ON HIKED EXTRAS—P. 77
It looks like Mar. 15 for purchasing agents who are scratching their heads and sharpening their pencils figuring out steel costs. The effects of boosted extras vary widely, ranging from only a few cents to $30 a ton. Many steel consumers are planning to pass extra costs on to their customers.

CAR COOLERS GIVE AUTO MEN HEADACHES — P. 88
A strong potential market is seen for automobile air conditioners. But the price—very close to $600—is still too high. Installation of the units defies mass production assembly techniques. Parts stretch from front to rear of the car and must be inter-connected for operation.

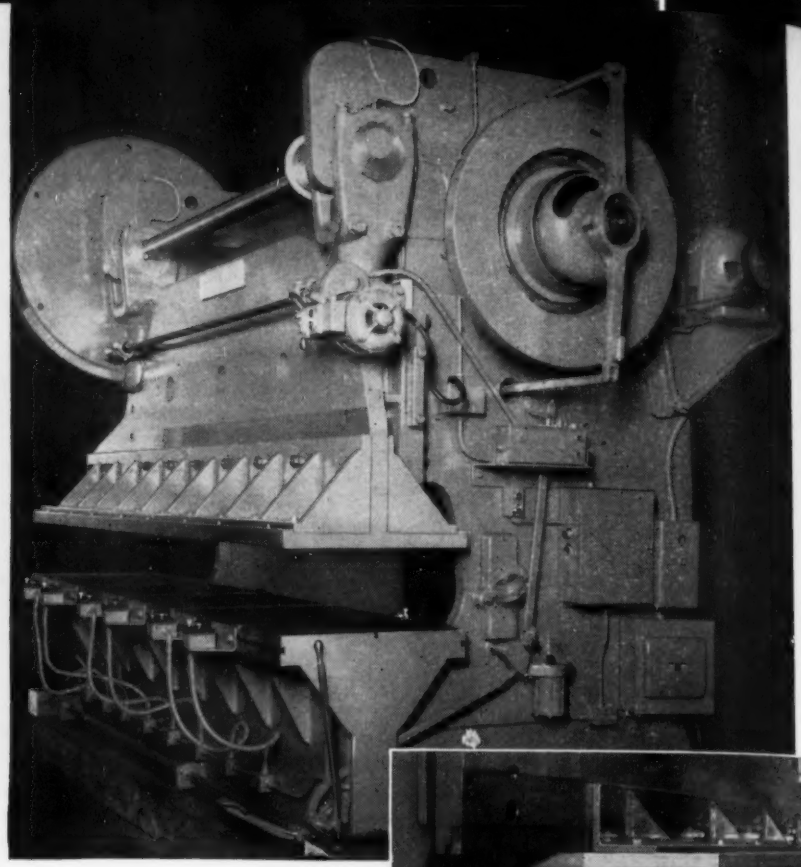
TOOL IMPORTS, EXPORTS FLOURISHED IN 1952—P. 99
Value of foreign-made machine tools imported into the U. S. in 1952 is estimated at slightly less than $50 million, a new record. U. S. exports of $125 million were highest since peak war years. Slump predicted in machine tool imports as domestic builders slim down inventories. U. S. tries to sell more abroad.

STEEL WAGE TALKS FOSTER MARKET PRESSURE—P. 161
Wage talks in the steel industry are being accompanied by renewed pressure from consumers who want to protect themselves against production interruption and or higher prices. A check of demand in major metalworking areas shows consumers are driving hard to build inventory, but most get only current needs.

THIRD ALUMINUM ROUND MAY EVAPORATE—P. 164
On paper it looked like the most successful of the expansions. But financing difficulties are now threatening to force Olin Industries and the Wheland Co. out of the third round aluminum expansion. Both have asked for government financing to go ahead. But it will take a reversal of policy to grant it.

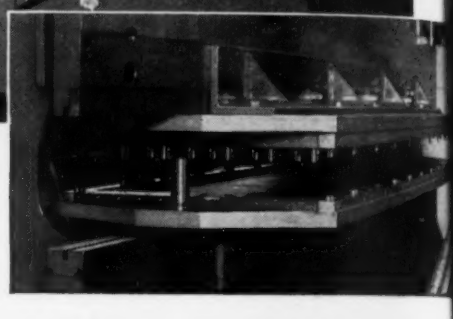


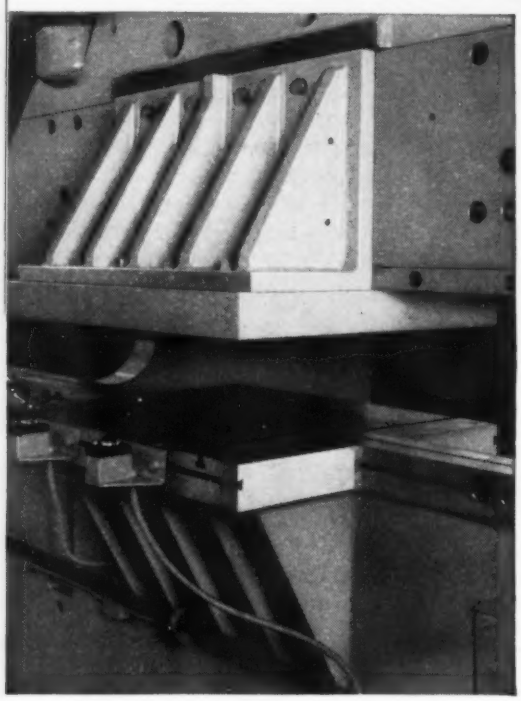
Large area, permanent wide bed and ram for press work



Large area, removable upper brackets

Large area, removable upper and lower brackets





Short, special purpose, removable upper brackets

JUMBO DIE AREAS...

on CINCINNATI PRESS BRAKES

With Cincinnati wide rams and beds, Cincinnati Press Brakes are now being used for both PRESS and PRESS BRAKE work.

These wide rams and beds are of two basic types—the permanent type for Press work only; the removable bracket type for general purpose requirements. With removable brackets, Cincinnati Press Brakes are dual purpose and function as Presses but also retain all the versatility of a Press Brake.

Both removable and permanent types of wide rams and beds are furnished in dimensions and areas to fit your particular requirements. We illustrate some of the combinations available on new machines.

Investigate!! Our Engineering Department will be glad to advise you on the profit and production possibilities of this new development in your shop. Write for Catalog B-2.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO U.S.A.

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National Business Publications

The Inadvertent Supporter

MALENKOV & CO. have been lying low for awhile. They laid their "peace" egg some time ago and are waiting for others to hatch it—or at least to keep it warm. While the rest of the world either sits on the egg (or tries to crack it to see what's in it) the Kremlin is busy laying other eggs.

With tight censorship and with little or no espionage almost anything can be happening in Russia. The best guess is that Malenkov & Co. are busy consolidating—via the purge—their position or positions. They could use help from the outside world to impress their people.

It looks as though they have gotten this help in the past week or so. Sir Winston Churchill has been one source of help to Russian "leaders" and has helped to build them up—whoever they are. Clement Attlee, British Labor opposition leader, has also helped out by condemning the American Constitution and our way of government.

Those who have seen the play before know that the Communists want a rift among the big free nations. That has been the Communist aim for years. It contributes to their goal—to get control of all peoples of the world. When you forget that you are a dupe to all kinds of Russian machinations.

Sir Winston knows very well what to expect from the Russians. He certainly knows he was "taken" in plenty by other conferences—high level and secret—in which he participated with the Russians.

He also knows that his speech to the House of Commons will alienate pro-British feelings in this country. He must know that his speech will again raise false hopes and play into the hands of Russia.

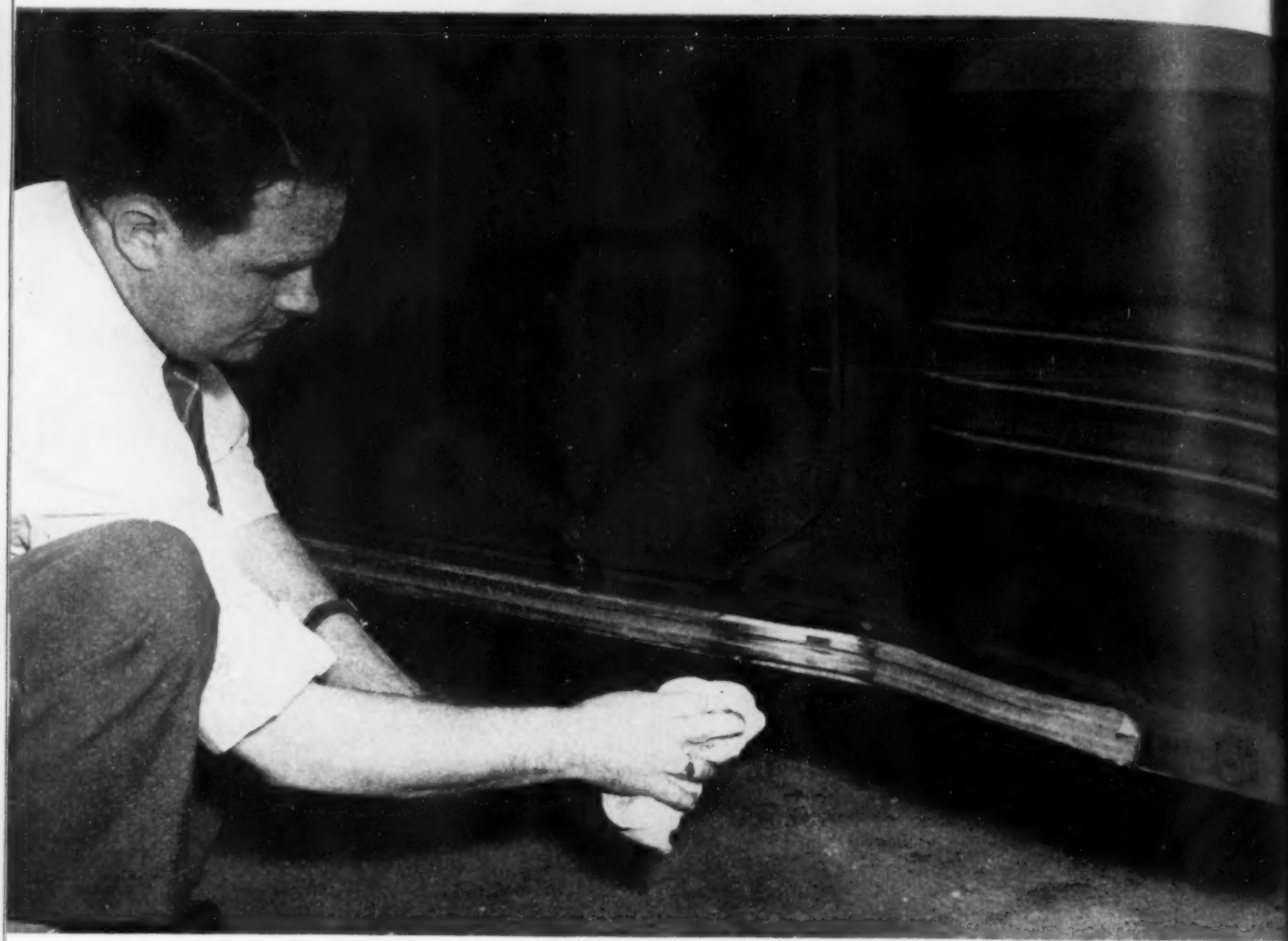
Sir Winston—despite his infinite wisdom—has inadvertently become a great press agent for people who have time and time again broken every promise they ever made to the free world. He has given official credence to the "change" in Russian attitude—which was nothing but a few "kind" words.

It may seem cynical to say so but there are a few reasons why Sir Winston's message should be taken with a grain of salt. Here they are: Recent district elections in England showed a high vote for the labor party; the conservatives had hoped to have a general election soon to show strength; and Sir Winston may want to match his brilliant record as a war Prime Minister with one as a peacemaker.

Tom Campbell

Editor

SHARON STEEL



Ten-year road test proof of '430' Stainless dependability

● Here's a shining example of what you can expect when you use Sharon "430" Stainless Steel in your product. This section of automotive moulding has been subjected to the grime and acids of the highway in all kinds of weather for more than 10 years. Yet, when a damp cloth, soap and elbow grease were applied, it immediately regained its original luster.

Proof of this kind is the reason why today many hundreds of thousands of cars on the highway are trimmed with "430" Stainless. Sharon "430" has been used for this type of product for over 15 years.

Sharon "430" Stainless is in good supply. It has been used with great success in hundreds of tough applications.

Get the whole story—ask yo Sharon representative or wr today for fully explanato "430" Stainless brochure.

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For information on Titanium contact Mallory-Sharon Titanium Corp., Niles, Ohio

Dear Editor:

Letters from readers

Metal-Ceramic Soldering

Sir

On p. 137 of the May 7 issue there appears an item regarding a new metal-ceramic combination which has simplified soldering problems. We would appreciate information concerning this development.

R. W. WEEKS
President

Wind Turbine Co.
West Chester, Pa.

Further information on the new metal-ceramic combination may be obtained from the American Lava Corp., 219 Kruesi Bldg., Chattanooga, Tenn.—Ed.

Controls Machine Tools

Sir:

In your Apr. 30 issue, p. 37, you refer to a rotating selector switch which is being used on radial drills and shell centering machines.

We would appreciate your forwarding us as much information as you have available on the switch in question.

J. A. FYFE
Vice-President

Seneca Falls Machine Co.
Seneca Falls, N. Y.

The manufacturer of the rotating selector switch is C. P. Clare & Co., 4719 Sunnyside Ave., Chicago, Ill., who will be glad to furnish you with more details.—Ed.

Still Good

Sir:

I should like to receive your permission to quote the following article in a doctoral dissertation which I am writing at the State University of Iowa: "The Use And Abuse Of Time Studies," Feb. 4, 1915, p. 301.

The dissertation, entitled "Labor Union Attitudes And Policies Relating To Production Standards And Wage Incentives Based on Time Studies," will be micro-filmed for national distribution. It is also expected that the manuscript will be published in book form.

C. M. BAUMBACK

Iowa City, Iowa

Pipe Corrosion

Sir:

In the Technical Briefs section of your Apr. 2 issue, p. 175, mention was made of two papers attacking directly the problem of hydrogen penetration of steel in refinery equipment.

We would appreciate it very much if we could obtain copies of the papers by T. Skei and A. Wachter; also by E. H. Tandy on hydrogen penetration. Reference is further made to F. C. Monkman and N. J. Grant covering accelerated oxidation due to vanadium.

E. H. KIRCHHOF
Asst. Librarian

Research Laboratories
Armco Steel Corp.
Middletown, Ohio

Write to the National Assn. of Corrosion Engineers, 1061 M & M Bldg., Houston, Tex., for copies of the papers.—Ed.

Demineralizer

Sir:

In the Jan. 29 issue the second article of the series "Modern Plating Equipment Is Designed For Any Shop" makes mention of a so-called demineralizer for removing impurities from the water supply.

You would oblige us by giving us the name and address of the manufacturer of these items.

T. JAKOBS

Technisches Uebersetzungsburo
Bonn, Germany

The demineralizer is made by Barnstead Still & Sterilizer Co., 2 Lanesville Terrace, Forest Hills, Boston, Mass.—Ed.

Casting Stainless Steel

Sir:

Referring to your Newsfront page in the Apr. 23 issue we note the last item on continuous casting of stainless steel with considerable interest.

We would appreciate very much knowing the name and address of the Canadian firm to which you refer.

G. F. APPLEGATE
Secretary

Ajax Electrothermic Corp.
Trenton, N. J.

The Canadian firm is the Atlas Steels, Ltd., East Main St., Welland, Ont.—Ed.

Trepanning

Sir:

I am interested in obtaining information on trepanning.

In your Aug. 9, 1951, issue you had an article entitled "Special Cutting Head Improves Deep Trepanning."

Would you kindly send me two sets of tear sheets of the above article?

C. F. ROE
Equipment Engineer

Eclipse Machine Div.
Bendix Aviation Corp.
Elmira, N. Y.

How to be right—always

When you buy . . . .
Cold Rolled Strip Steel

Approximately six months ago, Kenilworth adopted the policy of identifying all cold rolled strip steel shipped to customers by tagging each coil. Copies of the tags used are illustrated above. Because Kenilworth wants you to get the cold rolled strip steel you need and to be certain that you only pay for what you get, it is right to clearly classify the two kinds of cold rolled strip steel and tell you the advantages and disadvantages of both. Kenilworth stocks and sells both and is in a position to offer unbiased recommendations to help you select the steel which is best suited to your needs and which will cost you less in the end.

In cases where quality requirements are not too stringent, we have been able to save money for customers by suggesting a switch to Sheet Coil—fine where variation in physicals are permissible and gauge variations are not objectionable or where a fine surface finish is not required. In other cases, because its better physicals permit use of lighter gauges and because of assured maximum parts yield and greatly increased tool life, we've been able to show users how they can pay more for Thinsteel and still cut costs.

NORMALLY "IN STOCK" AT KENILWORTH

• Tempered Spring Steel • Republic-Enduro Stainless Steel Sheets • Cold Metal Thinsteel • Tin Coated Steel in Coils • Shim Steel—Coils and Cut Lengths • High Carbon Cold Rolled Strip • Low Carbon Sheets and Coils • CMP Thinsteel Stainless Strip • Low Carbon Cold Rolled Strip • Precision Slitting • Shearing • Leveling Service

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11 TIMES THE SERVICE

Steel mill was using rag roll as pinch roll on a shear unit. It lasted about three months on the job. Oil, heat, cutting and pressure contributing toward short life.

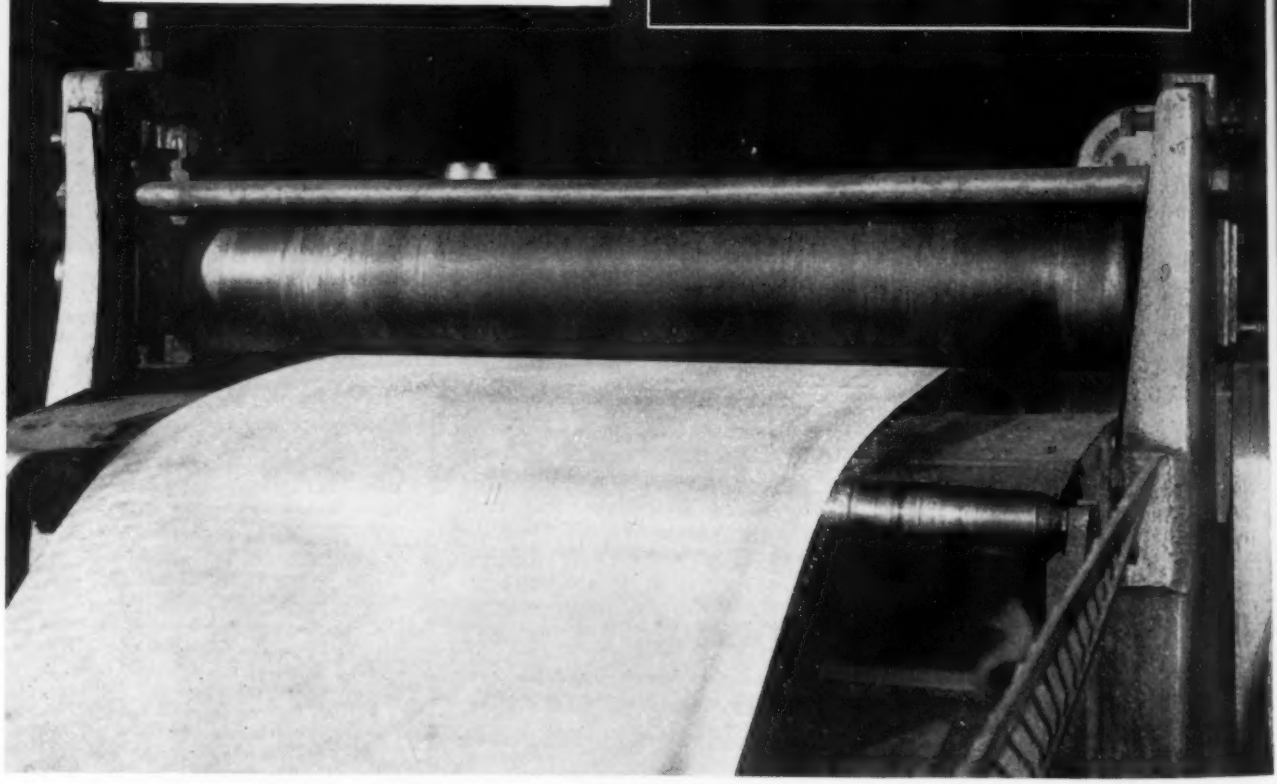
The G.T.M.—Goodyear Technical Man—recommended using a rubber-covered roll, specified compound and thickness to be used in covering the roll. This roll has served 33 months to date—*11 times the service at a slightly lower original cost.*

Why not discuss your roll covering problems—or procurement of complete rolls—with the G.T.M., or write Goodyear, Industrial Products Div., Akron 16, Ohio.

GOODYEAR INDUSTRIAL PRODUCTS

GTM-Specified TYPICAL ROLL APPLICATIONS FOR STEEL MILLS

PROCESSES	TYPES OF ROLLS	
Electrolytic Tin Line	Scrubber	Slitter
Carbon Steel Pickling	Wringer	Tension
Continuous Galvanizing Line	Pinch	Directional Carrying
Continuous Annealing Line	Hold-down	Coating



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Fatigue Cracks

by William M. Coffey

The far-reaching influence of your favorite family journal is sometimes unlivable. Take the case of my wife, 104,763 other wives of ffj readers (a fair guess) and Tom Campbell's late editorial on The Happy Gambler. This was a piece on the benefits to the economy from installment buyers. According to Tom, The Happy Gambler is the "darling of the ad man, the delight of the phone salesman, the target for the radio announcer and the answer to the television pitchman's prayer . . . and he *(or she)* causes homes to be built, factories to expand and employment to rise."

My wife is one of Tom's most ardent admirers. His editorials to her are the Bill of Rights, the Sermon on the Mount, Bowditch's Practical Navigator and the Treaty of Ghent all rolled into one. So when Tom says go out and buy, she goes out and buys—6 new kitchen cabinets, a new washing machine, a kitchen table and 4 stools . . . and all for "just another $5 a month." We (meaning me) were away at the time.

Obviously, we're trapped. But if your wife has been building homes, expanding factories and raising employment, send the bills to Tom.

There's always a story behind these editorials. On Black Thursday, one week before the 1929 crash, Tom happily bought a new car, started a house and had a baby. And today Tom is editor of the National Metalworking Weekly. Et nous, Tom?

Definitions

Florine K. Bender of the Armour Research Foundation, Illinois Institute of Technology, has graciously sent her GLOSSARY OF RESEARCH TERMS which carries on the good work started a few weeks ago:

"A preliminary study of the problem is being made"—I am trying to find out what this is all about.

"This approach to the problem will be undertaken at the first opportunity"—This looks like it's going to be a heck of a job. I wonder if there are any openings at Stanford Research Foundation.

"A literature survey of the problem is being made"—Somebody told me he thinks there is a report on a related problem in the files issued either by BRL or Picatinny Arsenal, both of these reports seem to be missing.

"In conference with other members of the technical staff, their past experience bears out the fact that"—A bull session on sports, women, foreign affairs, women and related subjects.

"Other work done on this subject shows that"—My Prof. at IIT thinks that possibly he tried such an experiment in 1906 but he is not sure.

"Design changes based on actual tests are being incorporated into the motor"—The damn thing blew up so we are tripling the wall thickness.

"Results are inconclusive and further experimentation is necessary"—After the range is repaired we will repeat the test.

"Feasibility Study"—We will find some excuse to extend this contract for another $100,000.

"Contributing Personnel"—5% of the list on the cost sheets.

"It is to the advantage of the sponsor to continue this work"—If you don't kick in with another $150,000 you will be out the $300,000 we have already spent.

"Future Plans"—We've got to save something for next month's report.

Puzzlers

Richard Cooper, J. G. Cowling, Jordan D. Wood, Florine Bender and Mr. Nakamura all submitted solutions to the marble puzzler—all of them different, but all look ok. Space doesn't permit us to give a solution here so we will send the solution to all interested fans. Just drop us a line.

New Puzzler

An amateur carpenter, for some crazy reason, made a certain number of one-foot square cubes out of plywood and wanted to paint each face of each cube either red or black. How many cubes can he so paint which will be different from one another?

Bonus puzzle: A few months back we left out a puzzle. 3,786 letters were received in protest. To get back on the track, here's a bonus puzzle.

In what field of activity are the following terms commonly used?

Inner-perspirator
Pomus Dust
De-Energizer
Electronoscopes
Radioactive Wave Pools

Hint: Ask your son if he's around 10 years old.

AVAILABLE FROM STOCK

New Machine Tools made by Germany's Leading Manufacturers

All designed for standard American voltages and frequencies; calibrations and lead screws in inches. Materials and workmanship guaranteed. Complete operating instructions in English.

DRILL PRESS, Alfing—26" x 28" table, 1¼" capacity
GRINDER, CARBIDE TOOL, Thielenhaus—4 grinding stations, rough to finest finish
GRINDER, TOOL & CUTTER, Reinecker—8"x 15¾", all attachments
GRINDER, TWIST DRILL, Cawi—For Drills 1/16" to 1"
GRINDER, UNIVERSAL, Ferrari—8½"x19¼" and 12½" x 47½"
JIG BORERS, OPTICAL, Lindner—32" x 16" and 44" x 24" table
LATHES, ENGINE, Goeppingen—18" x 60" and 18" x 80"
LATHE, ENGINE, Heyligenstaedt — 24½" x 78½"
LATHE, ENGINE, Heyligenstaedt — 20" x 118½"
LATHES, ENGINE, Lieber—16" x 60" and 16" x 36"
LATHE, GAP, Heyligenstaedt—Swing 24½" in Gap; 45" without lead screw
LATHE, HEAVY DUTY, V D F—30" swing; 22'11" between centers
LATHE, PRODUCTION PRECISION, Magdeburg 11" x 19½"
LATHE, RELIEVING, Reinecker—9 7/16" center height; 24" between centers
LATHE, TURRET, Vertical Drum Type, 16-station, Gildemeister—1 9/16", 2" and 2½" capacity
LATHE, TURRET, Scheu—2" capacity; Swing 17"
MILLER, CLIMB PRODUCTION, Jerwag—55" x 14"
MILLER, HORIZONTAL, Biernatzki — 59" x 12½", Morse Taper 5, rapid traverse
MILLER, PATTERNMAKER'S, Bohner & Kohle 48" x 28"; workpiece up to 8'6"
MILLER, SLOT, Forst—⅞" slot width; 1" keyway, 29" slotting length
MILLER, UNIVERSAL, Biernatzki — 59" x 12½", Morse Taper 5, rapid traverse
MILLER, UNIVERSAL, Hueller — 11¼" x 48½"
MILLER, VERTICAL, Biernatzki—55" x 14", No. 50 taper, rapid traverse
MILLER, VERTICAL, Hurth—34¼" x 10½"
MILLER, VERTICAL, Hurth—48" x 13¾"
MILLER, VERTICAL & BORING MACHINE, Hurth—39¼" x 11¾"
MILLER, VERTICAL & HORIZONTAL, Nube—44" x 12"; equal strength motors for both vertical and horizontal spindles
POWER HACKSAW, Gutherlett—8", 12", 14" capacity
SCREW MACHINE, AUTOMATIC, B M W—¾" capacity
SCREW MACHINE, HAND, Hestika — 1" capacity
SHAPER, HYDRAULIC, Klopp—26", 33½" 39¼" stroke
SHAPER, MECHANICAL, Klopp — 16¾" 20 2/3", 26⅝" stroke

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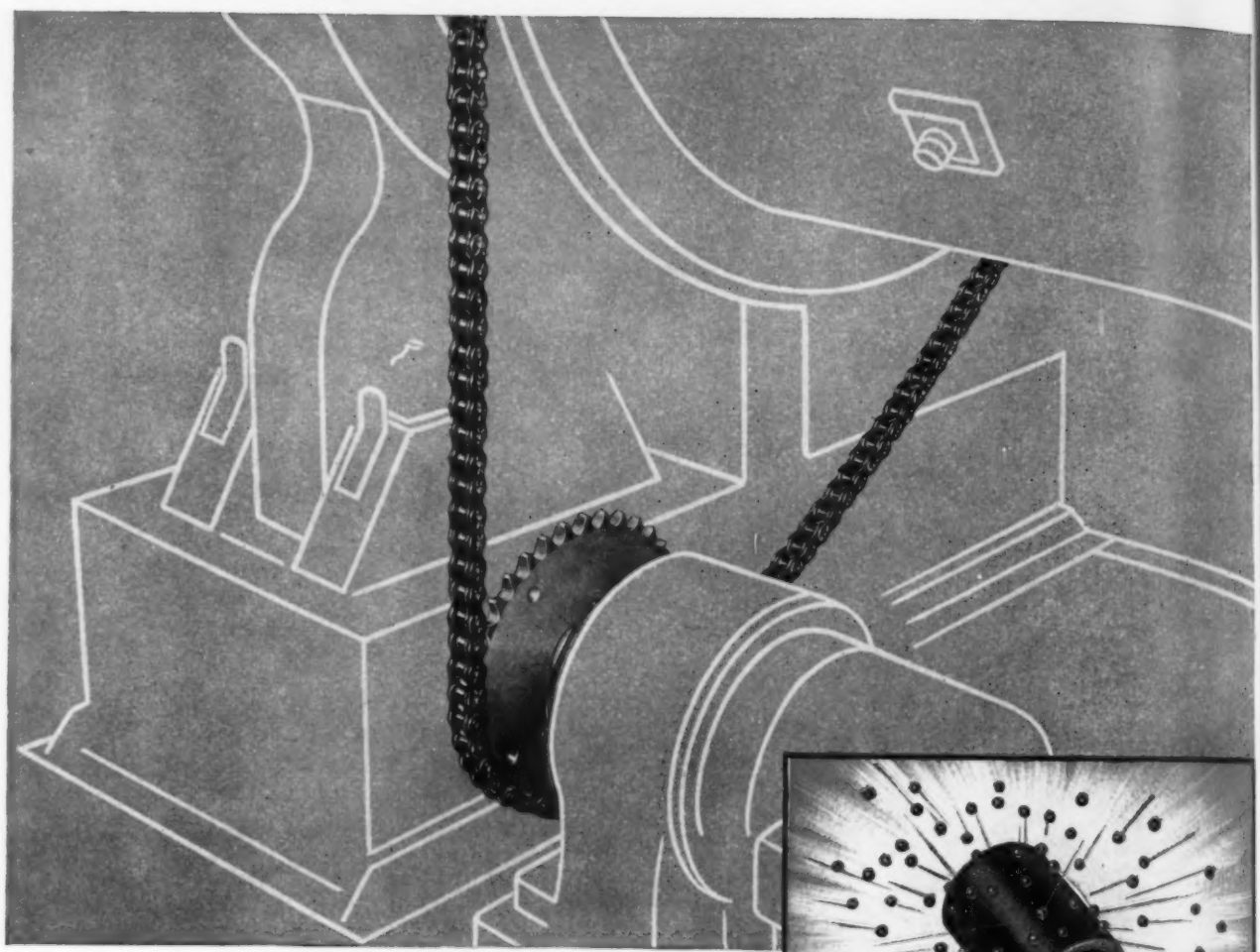

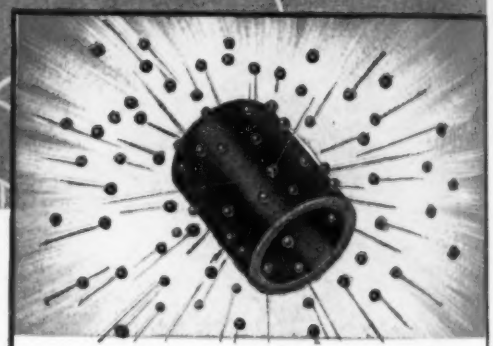

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Dates to Remember

Meetings

May

AMERICAN STEEL WAREHOUSE ASSN., INC. — **Annual meeting, May 24-26, The Shoreham, Washington. Association headquarters are at 442 Terminal Tower, Cleveland.**

ALUMINUM WARES ASSN.—**Annual meeting, May 24-27, The Greenbrier, White Sulphur Springs, W. Va. Association headquarters are at 1506 First National Bank Bldg., Pittsburgh.**

COPPER & BRASS RESEARCH ASSN.—**Annual meeting, May 24-27, The Homestead, Hot Springs, Va. Association headquarters are at 420 Lexington Ave., New York.**

EXPOSITIONS

NATIONAL METAL SHOW—**Oct. 19-23, Cleveland.**

NATIONAL INDUSTRIAL SERVICE ASSN.—**Convention, May 24-28, Statler Hotel, New York. Association headquarters are at 303 Lexington Ave., New York.**

SCIENTIFIC APPARATUS MAKERS ASSN.—**Annual meeting, May 24-28, The Greenbrier, White Sulphur Springs, W. Va. Association headquarters are at 20 N. Wacker Drive, Chicago.**

HYDRAULIC INSTITUTE—**Spring meeting, May 25-27, Seaview Country Club, Absecon, N. J. Institute headquarters are at 122 E. 42nd St., New York.**

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS — **Annual conference and exhibit, May 25-28, Hotel Schroeder, Milwaukee. Society headquarters are at 29 W. 39th St., New York.**

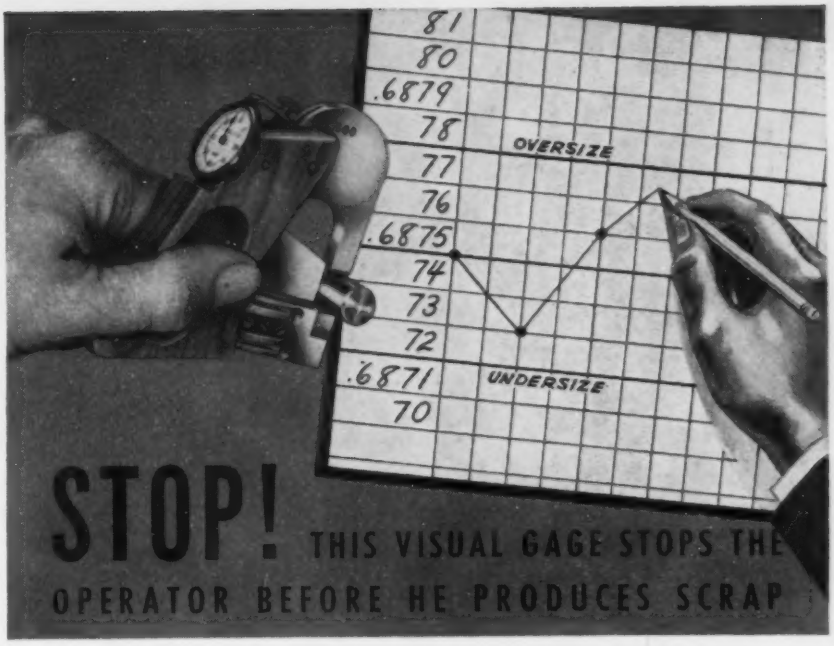
NATIONAL ASSN. OF PURCHASING AGENTS—**Annual meeting, May 25-28, Los Angeles. Association headquarters are at 11 Park Place, New York.**

AMERICAN IRON & STEEL INSTITUTE —**Annual meeting, May 27-28, Waldorf-Astoria Hotel, New York. Institute headquarters are at 350 Fifth Ave., New York.**

AMERICAN SOCIETY FOR QUALITY CONTROL — **Annual convention, May 27-29, Convention Hall, Philadelphia. Society headquarters are at 70 E. 45th St., New York.**

AMERICAN GEAR MANUFACTURERS ASSN.—**Annual meeting, May 31-June 3, The Homestead, Hot Springs, Va. Association headquarters are at Empire Bldg., Pittsburgh.**

EDISON ELECTRIC INSTITUTE — **Annual convention, June 1-4, Atlantic City, N. J. Institute headquarters are at 420 Lexington Ave., New York.**



By checking sample workpieces in accordance with good Quality Control methods, a machine operator can tell with this *indicating* snap gage just how he's doing. This gage shows more than old style snap gages. It shows not only whether the workpiece is within acceptable tolerances, but more important, it shows the direction of dimensional change or trend toward out-of-tolerance *before* it's too late. If the size is approaching outside limits, the operator can correct his machine so that time and material are not wasted by producing scrap.

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There's a basic change going on in the metalworking industry —a wholesome, profitable change, with the pace increasing daily—as alert shop men discover that on many operations light, rugged, versatile Delta power tools can out-perform and out-produce heavier, costlier installations.

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DELTA TOOLS ARE ADAPTABLE—unusually mobile and portable, they can be tooled for a given job, kept in the tool crib, then moved into and out of production lines with no lost time for setting up; can be used for continuous high-production runs of single or multiple operations.

DELTA TOOLS ARE DURABLE—rugged to withstand hard usage . . . precision built and beautifully balanced, they perform most efficiently throughout long, useful lives.

DELTA TOOLS ARE ECONOMICAL—first cost is moderate; and is quickly amortized by low power cost, low maintenance expense, increased output and elimination of bottlenecks and slower methods.

Dollar for dollar, Delta tools deliver more. Here are 5 reasons why:

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2. Precision bored bearing seats assure accuracy and smooth operation.
3. Preloaded bearings provide maximum rigidity and accuracy under load.
4. All spindles, arbors and collars are precision ground for accuracy.
5. Dynamic balance of rotating parts insures smooth, true performance.

DRILL PRESSES

With Delta Drill Presses, you can work out any set-up to suit your own need—using one spindle or as many as your job requires. Any set-up you want is not merely possible, but is actually very easy—because Delta drill presses have the flexibility to make them fit readily into any multiple spindle set-up. Low in cost, easy to maintain, readily portable, the Delta Drill Press is a good example of fine engineering, rugged construction and compact design.

A 14" DRILL PRESS

Available with either No. 1 Morse taper spindle or Jacobs chuck that takes straight shank drills from No. 60 to full ½-inch. In high- or slow-speed models. Capacities up to ½-inch in cast iron; ⅜-inch in steel. Quill has 4-inch stroke. Spindles are readily interchangeable—a simple matter to select the right spindle for any job.

B 17" DRILL PRESS

Available with either No. 2 Morse taper spindle or ½-inch Jacobs chuck. In high- or slow-speed models. Capacities up to ¾-inch in cast iron. Quill has 5-inch stroke.

METAL CUTTING

C CUT-OFF MACHINE

Cut steel, aluminum, copper, brass in one fast, easy motion with a Delta Cut-Off Machine. It's easily changed from a non-ferrous to a ferrous cut-off machine by switching from steel blade to abrasive wheel.

D 14" METAL CUTTING BAND SAW

Cuts anything from carbon tool steel to asbestos, in hundreds of applications. Four metal-cutting speeds: 125, 175, 250, 340 f.p.m.—change from metal to wood with just a flip of your finger and simple belt change.

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E 7" PRECISION METAL SHAPER

This husky "machine of a thousand uses" is extremely popular in machine shops, tool making and model making shops, schools and experimental departments. "V"-type ways on ram, tool head and front face of main frame insure accuracy and longer life.

FINISHING MACHINES

F DEBURRING Machine

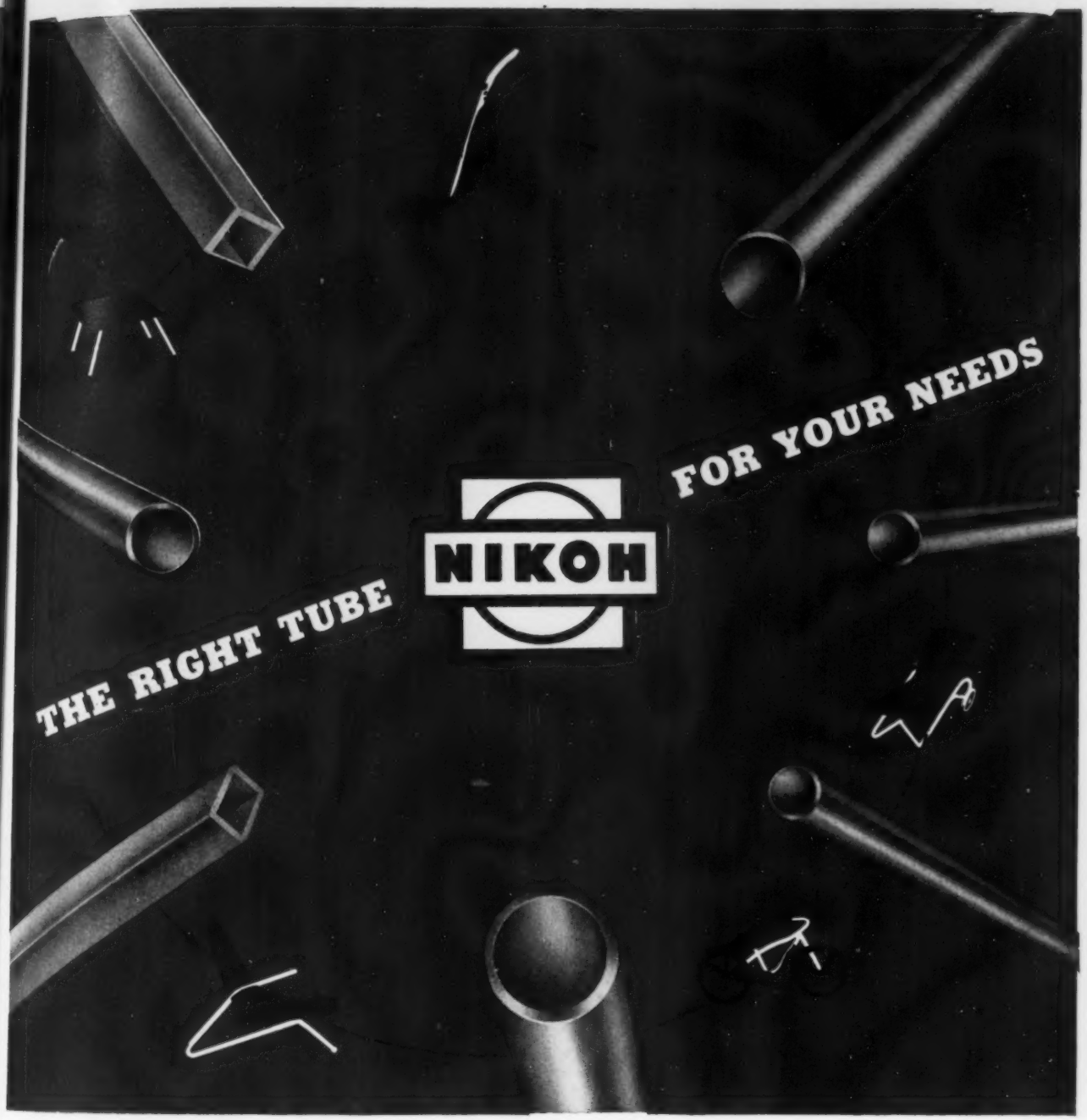
The easy, practical, low-cost way to handle a multitude of metal removal operations. Eliminates bother of "set-up wheels" and dressing of "grinding wheels"—inexpensive, long-wearing abrasive belts are easily replaceable. Much lower in cost than any comparable machine on the market.

G ABRASIVE BELT FINISHING Machine

This 6" belt-type abrasive finishing machine is heavy and husky enough to do dozens of sanding, polishing and finishing operations, yet is portable. Operates vertically or horizontally.

H ABRASIVE DISK FINISHING Machine

This machine is ideal for an accurate, fast finishing job. It can be moved to any place in the shop or on the production line. Abrasive disks can be renewed every few minutes if necessary.



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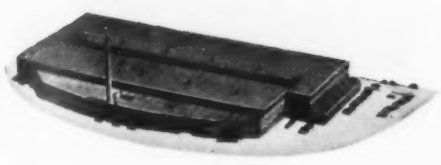

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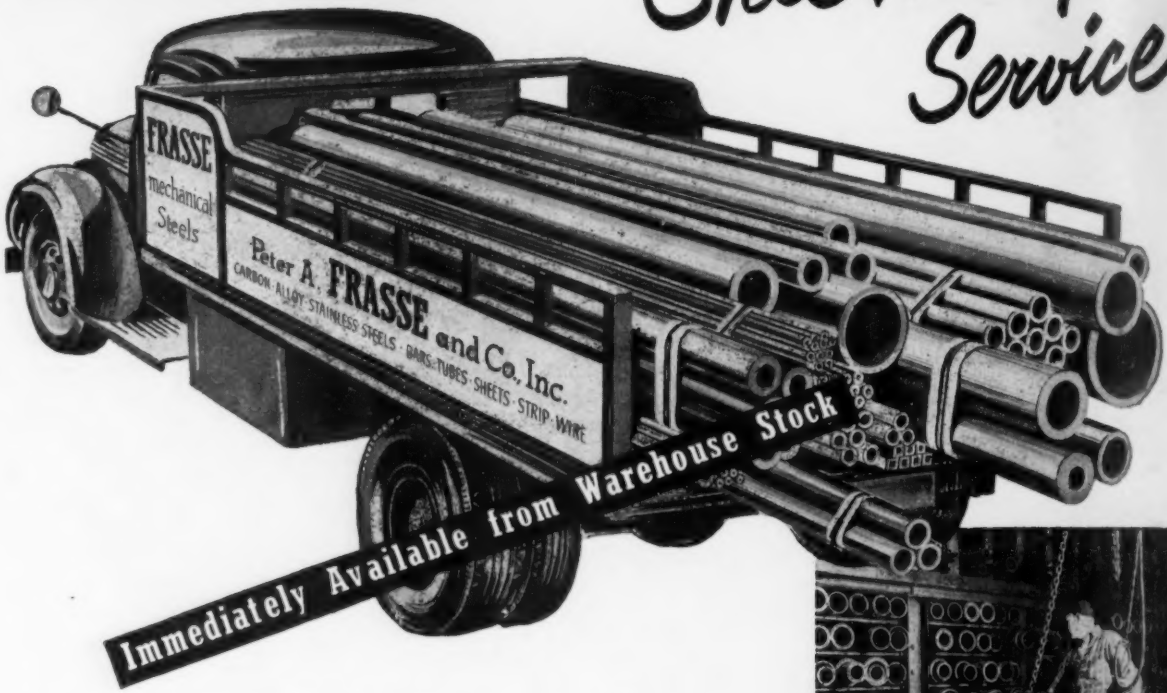
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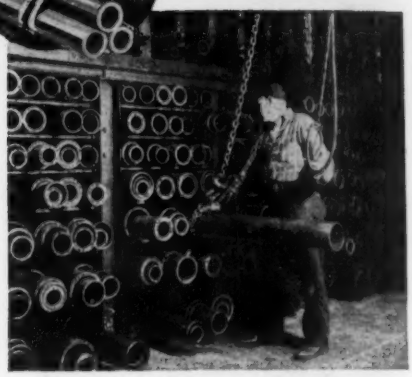

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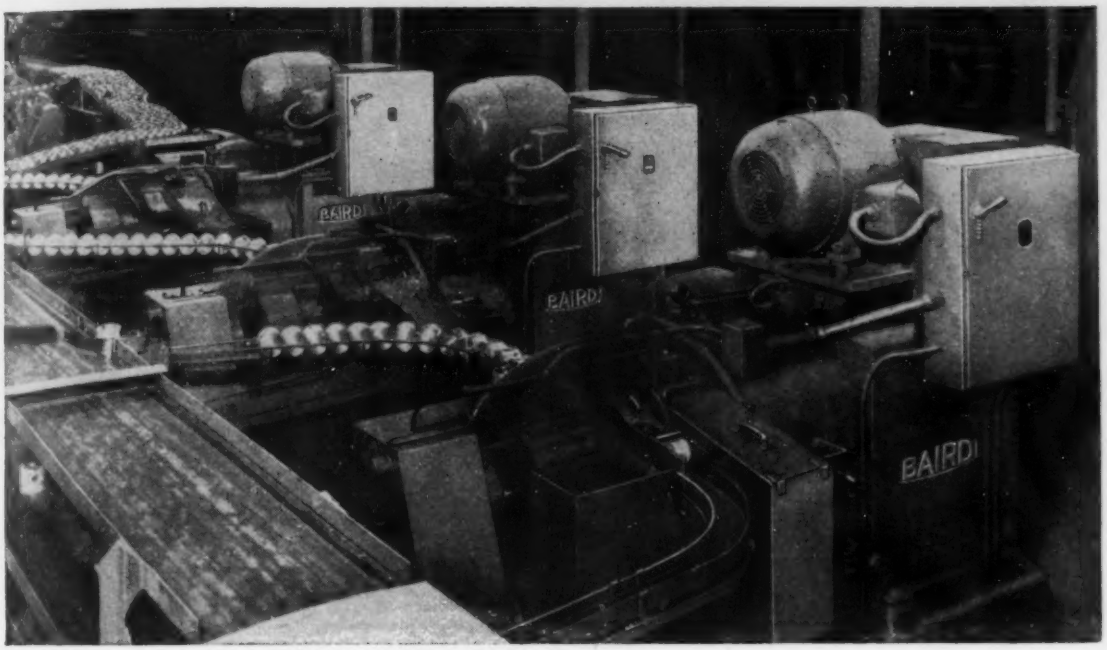

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Other valuable features are: easy access to all tooling, individual tool slides, individual spindle speeds, automatic chucking, maintained accuracy over a long service life.

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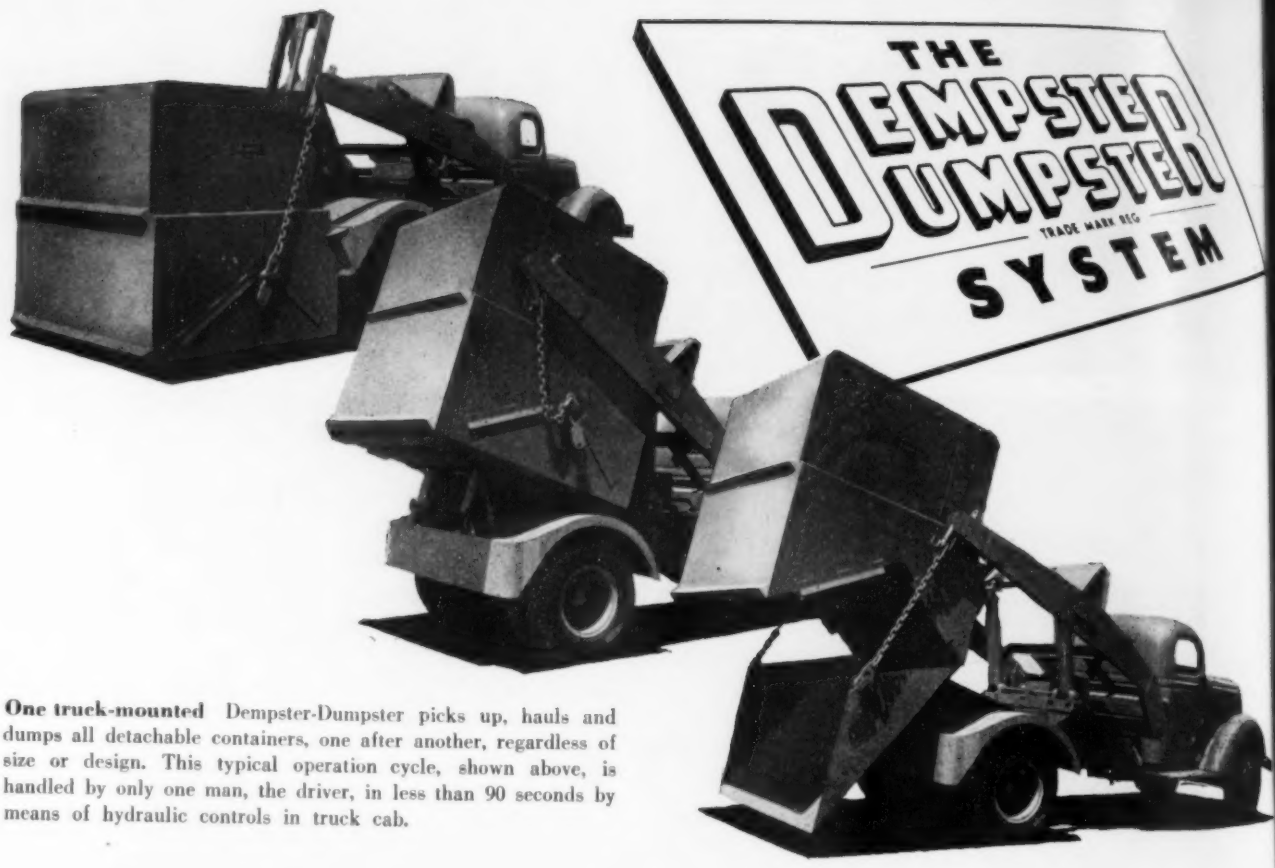
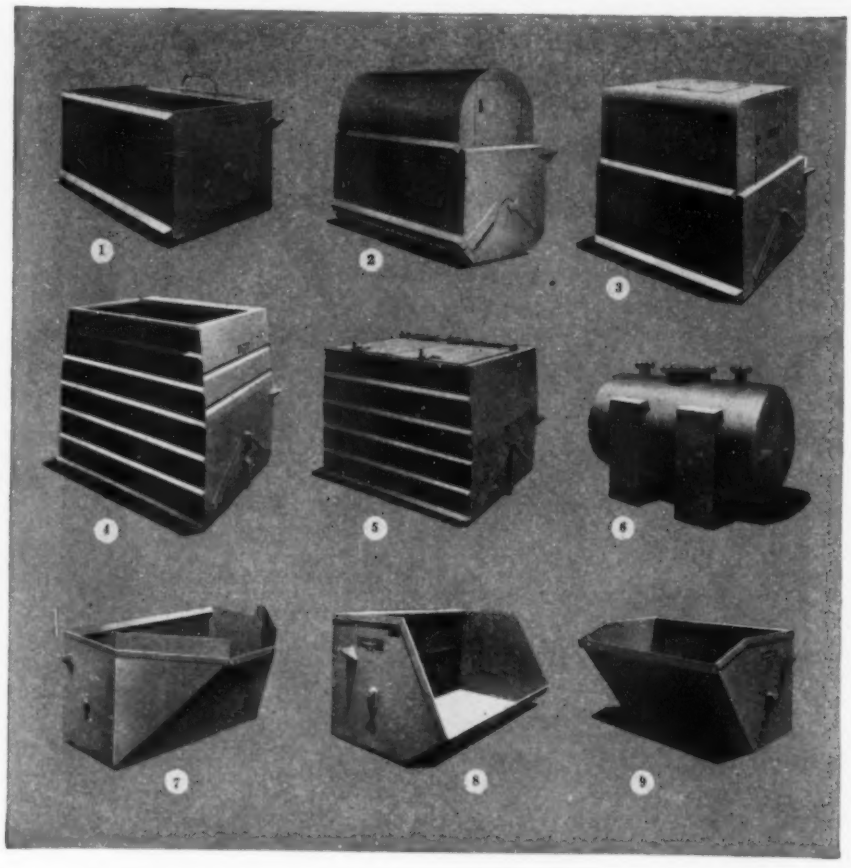


One truck-mounted Dempster-Dumpster picks up, hauls and dumps all detachable containers, one after another, regardless of size or design. This typical operation cycle, shown above, is handled by only one man, the driver, in less than 90 seconds by means of hydraulic controls in truck cab.



1—Cuts Cost of Equipment and Operation— It is not unusual for one Dempster-Dumpster to perform the work of from 3 to 5 conventional trucks . . . reducing investment accordingly. Eliminating trucks also means eliminating tires, gas, oil, maintenance and man hours.

3—Eliminates Re-Handling of Materials — Re-handling of materials, which by conventional methods are hand loaded by loading crews into dump trucks, is eliminated. Each detachable container remains at its convenient location until loaded. Then, in less than a minute, it is picked up by Dempster-Dumpster and taken to destination. There it is dumped or set down intact . . . saving hundreds of man hours annually.

• • •

At left are a few standard containers for general requirements—1—Drop Bottom Container built up to 10 cu. yd. capacity to handle heavy materials. 2—Apartment Type for bulk trash and rubbish with sump bottom for handling moist materials. 3—Universal Type available with top and end doors. 4—Drop Bottom Pressed Steel Type for lighter service. 5—Drop Bottom Pressed Steel Type with counterbalanced spring lids. 6—Tank Type Container meeting A.S.M.E. specifications. Capacities up to 1,200 gallons. 7—Tilt Type with Converged Lip for handling fine aggregate, wet or fluid materials. 8—Skip Type with Lip to assist in holding certain types of loaded materials in place. 9—Tilt Type for handling heavy materials. Built water-tight.

D E M P S T E R B R O S . ,

MOST EFFICIENT METHOD OF MATERIALS HANDLING BY TRUCK EVER DEVISED

If you collect and move bulky, light or heavy materials in your plant operation . . . be they solid, liquid, dust, rubbish or waste, the Dempster-Dumpster System merits your careful consideration and investigation. This revolutionary method of bulk materials handling by truck can save you thousands of dollars annually!

The fundamental reason why the Dempster-Dumpster System is the most efficient method of materials handling by truck is because, in this system, one truck serves scores of detachable containers. In other words, a truck-mounted Dempster-Dumpster . . . with only one man, the driver . . . picks up, hauls, dumps or sets down intact . . . one after another . . . any required number of big Dempster-Dumpster Containers.

The hydraulically operated Dempster-Dumpster is mounted on any make truck chassis of suitable size.

The steel containers are available in a wide variety of designs best suited to the type of materials handled—be they bulky, light or heavy . . . solids, liquids or dust . . . trash or rubbish. They range in size up to more than three times the capacity of the average dump truck body. The containers are spotted inside and outside your plant at convenient materials accumulation points. A few of the dozens of detachable containers are shown here so that you may see the flexibility of this system in handling all types of materials in your plant with one truck. It may be that none of these containers will fit your own particular need. But remember there are Dempster-Dumpster Containers that will, either standard or special design.

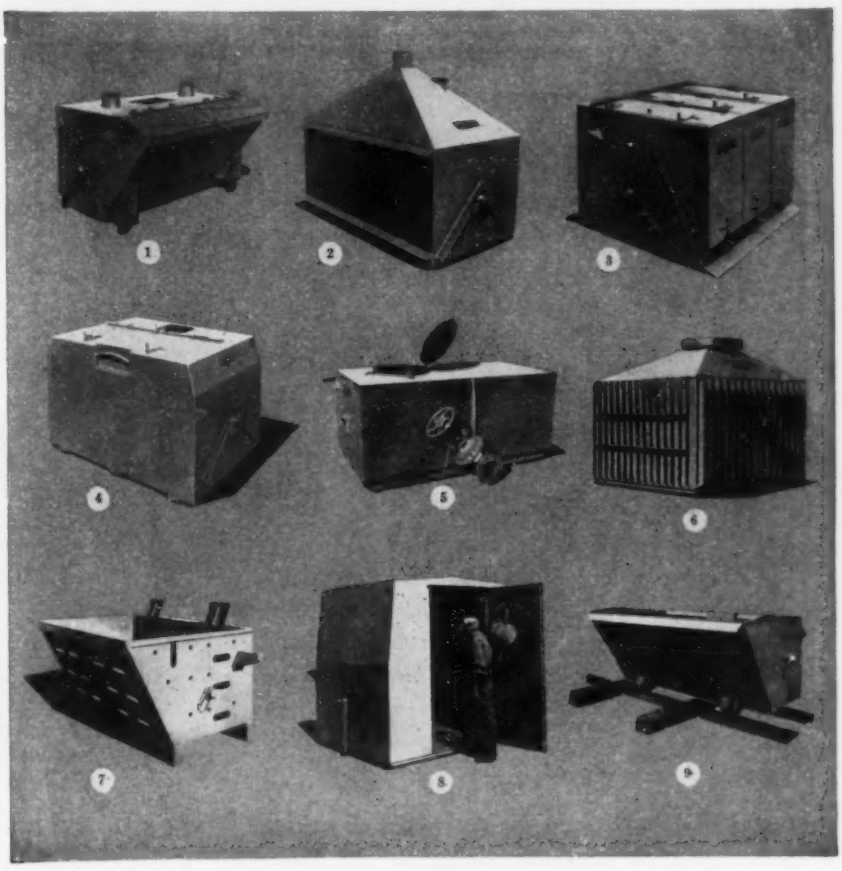
More efficient and lower cost materials handling in your plant may be simply a matter of getting the probing minds of your engineers and ours together. Our files contain hundreds of inquiring letters that ultimately resulted in savings of thousands of dollars annually in every conceivable type of manufacturing plant. A discussion with our engineers might develop the same results for you. If advisable, they will be glad to make, without obligation on your part, a proper survey to determine just what equipment you may need. The Dempster-Dumpster System is manufactured exclusively by Dempster Brothers, Inc.

2—Eliminates Standing Idle Time— One man, the truck driver, replaces truck loading crew. Detachable containers are pre-loaded through normal accumulation. Truck-mounted Dempster-Dumpster and driver never stand idle because there is always a pre-loaded detachable container to be serviced.

4—Increases Efficiency, Sanitation and Good "Housekeeping"—The Demp-Dumpster System is a complete, unified plan for area-wide materials handling. Materials to be disposed of or transferred are placed in a nearby container as they accumulate. Containers used for trash and rubbish are fire-proof, rat-proof and fly-proof. No other method of materials handling by truck can match the Dempster-Dumpster System in efficiency and low operating cost!

• • •

At right are a few containers built for special requirements— 1—Five cu. yd. container with swivel casters for handling waste blast sand. 2—Three cu. yd. Dust Collector Type equipped with gaskets. 3—Multi-Karry Container equipped with three 2 cu. yd. steel boxes with casters and lids. 4—Six cu. yd. drop bottom container with two spring-hinged lids and special loading opening in top. 5—Rectangular Tank Type Container with gate valve and gasketed Lid. 6—Chlorinator Ash Container designed for handling hot residue approximately 1500° F. 7—Tilt Type Container built for cast linings for handling hot materials. 8—One of several special "Tool and Equipment" Type Containers. 9—One of several types of special built containers equipped with ball bearing trucks.



353 Dempster Bldg., Knoxville 17, Tenn.

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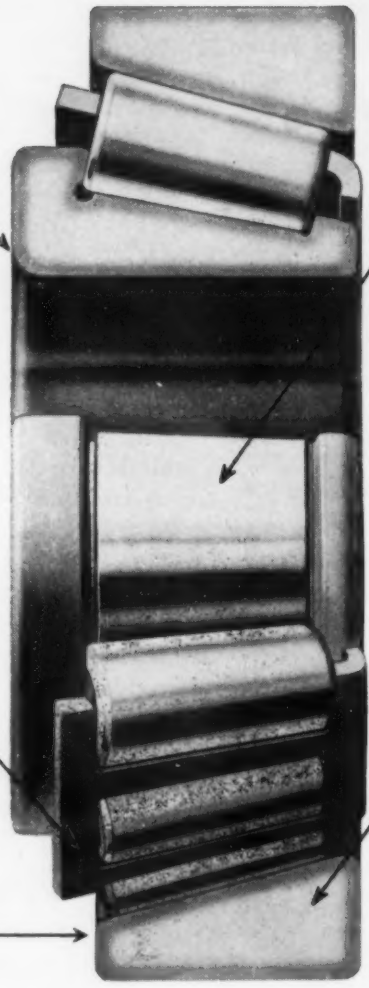
Only one tapered roller bearing gives you all these 10 advantages...



1 **GENEROUS RADIUS**—for greater shaft strength.

2 **CHOICE OF 26 DIFFERENT TYPES.**

3 **SOFT STEEL CAGE**—to keep rollers separate and prevent scuffing.

4 **PRECISION MANUFACTURE**—which makes possible bearings with a maximum runout tolerance of less than 75 millionths of an inch.

5 **CASE-HARDENED BEARING SURFACES**—to resist wear.

6 **MICRO-INCH SURFACE FINISH**—to minimize friction.

7 **CHOICE OF 5850 SIZES.**

8 **TIMKEN FINE ALLOY STEEL**—specially developed to give long bearing life.

9 **TOUGH CORE**—to resist shock.

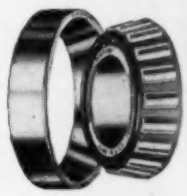
10 **POSITIVE ROLLER ALIGNMENT**—gives maximum bearing capacity.

...it's stamped with the trade-mark "TIMKEN®"

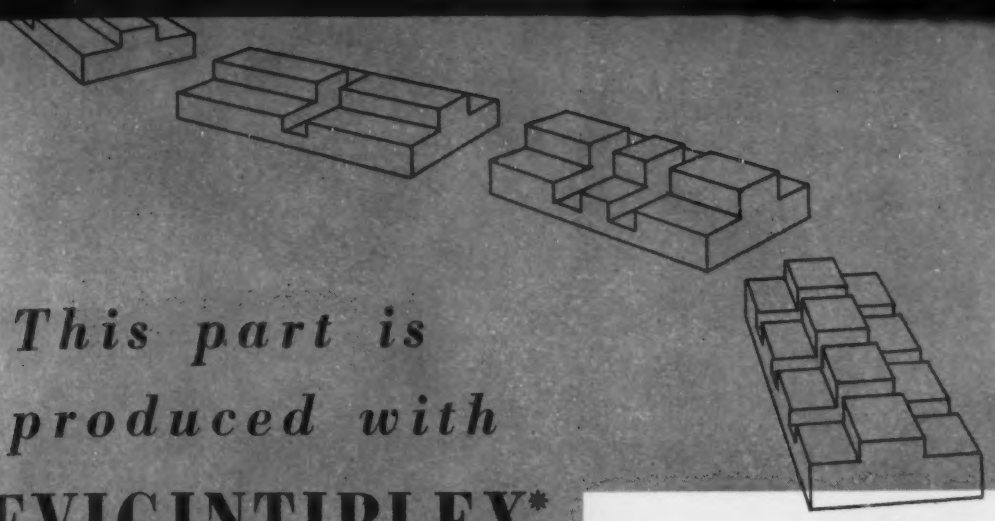
NO other bearing gives you *all* the advantages you get with Timken® bearings. Ten of these advantages are listed above. They result from the fact that the Timken Company is the foremost producer of tapered roller bearings and leads in 1) advanced design, 2) precision manufacture, 3) rigid quality control, and 4) special analysis steels.

Be sure that every bearing you use in the machines you build or buy is stamped with the trade-mark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

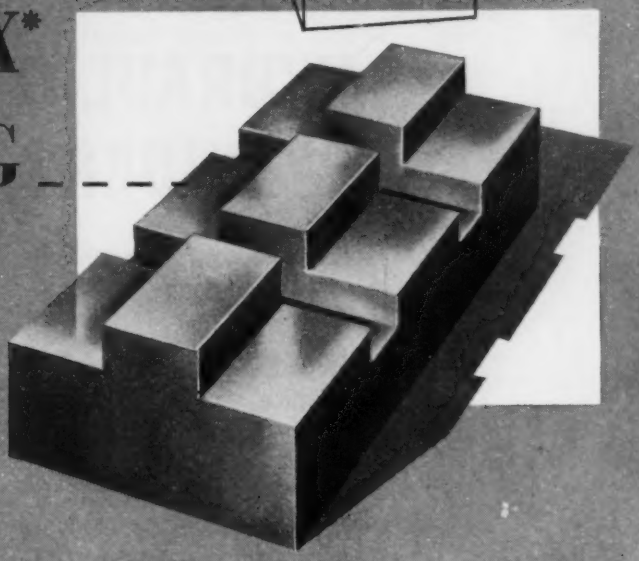


NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ◎ AND THRUST →◎← LOADS OR ANY COMBINATION



This part is produced with

UNDEVIGINTIPLEX* BROACH TOOLING



* *to have nineteen-fold use*

A metal parts manufacturer recently asked Detroit Broach for broach tooling which could produce 19 different sizes of a similar part. Because production of each size was low, it was essential that a universal tooling set-up be created to realize the full economies of broaching.

The problem involved the broaching of a tongue and one, two or three cross slots in the metal parts which varied in width and length.

Detroit Broach engineers tackled the problem and came up with undevigintiplex tooling. Two stations were provided on a 25-ton single ram vertical broaching machine to broach the tongue and the cross slots. To take up for the variation in the cross slots of the 19 different sized parts, spacers were used between the broaches. And for the differences in width and length of the parts, inserts were used in the workholding fixture. Result . . . 19 different sized parts produced in a single tooling set-up!

This is just typical of the economies that can be had through universal broach tooling when a number of similar low production parts are needed by manufacturers. You, too, may have an application that can be materially reduced in time or cost by the economy of broaching. It will pay you to consult Detroit Broach for engineering or production data.

WORLD'S LARGEST MANUFACTURER OF BROACHES AND BROACHING TOOLS EXCLUSIVELY

DETROIT BROACH COMPANY

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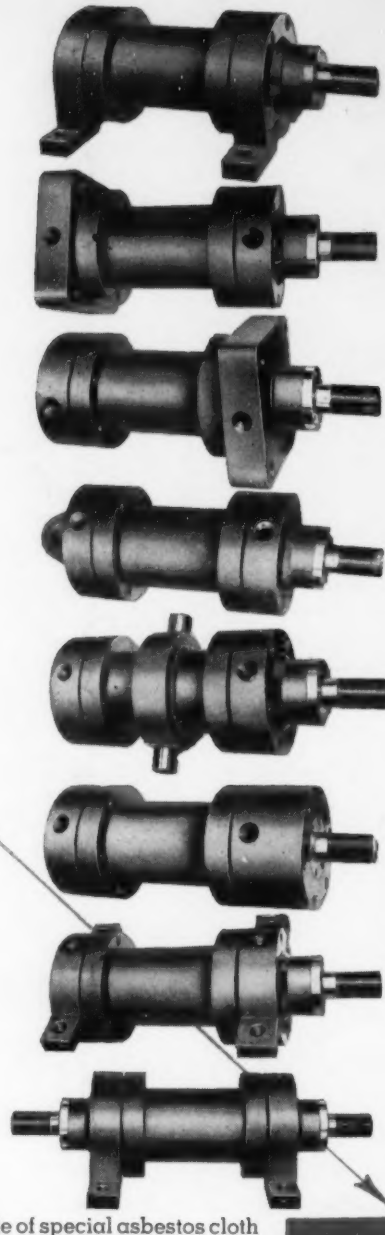
LINDBERG HYDRAULIC CYLINDERS

. . . now available for pressures to 3000 PSI

For extra power applications, it'll pay you to investigate the new Lindberg line of hydraulic cylinders for operation up to 3000 PSI . . . ruggedly and heavily designed for extra performance. Added to the 1500 PSI hydraulic cylinders, this line gives you a selection from 0 to 3000 PSI . . . and supplements the Lindberg line of air cylinders.



Check these Lindberg features for dependable, low cost power for lifting, forcing, pulling, pressing, pushing and clamping:

ROTATING CAPS . . . Caps can be easily rotated in order to position ports for piping. Just remove cap screws, and revolve head cap . . . it isn't necessary to disassemble cylinder. This feature permits simplified piping, and frequently eliminates need for T-fittings or elbows.

NO TIE-RODS . . . Welded flange construction eliminates need for tie-rods . . . insures proper alignment.

PACKING RESISTS OIL AND TEMPERATURE . . . Chevron type piston rod packing is made of special asbestos cloth and rubber compound . . . resists high temperature . . . is not affected by oil.

NEOPRENE O-RINGS . . . Conventional gaskets are replaced by Neoprene O-rings. Sealing action is automatic . . . the higher the pressure, the tighter the seal.

SOCKET-HEAD CAP SCREWS . . . All screw heads are in the open and easily accessible from outside the cylinder. It is not necessary to partially disassemble cylinder to tighten screws.

Lindberg 3000 PSI Hydraulic Cylinders come in 8 mounting types and 10 bore sizes from 2" to 8".

New 28-page bulletin, No. 701 carries detailed drawings of both 3000 and 1500 PSI cylinders . . . chart-tables show bore sizes, pressures, etc., ask for your copy, today.

LINDBERG AIR & HYDRAULIC DIVISION

Lindberg Engineering Company · 2452 West Hubbard Street · Chicago 12, Illinois

The Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

STEEL SHEET DIRECTLY REDUCED FROM IRON OXIDE POWDER is being produced in a pilot plant operation. Maximum sheet width is 60 in. Deep drawing quality sheet may be possible in this variable density product.

CURRENT RUSSIAN ALUMINUM PRODUCTION is estimated at 200,000 tons per year. Barter agreement shipments from Sweden supplement this supply. Sweden, only slightly embarrassed, claims the arrangement is necessary for its economy and is good use of heavy hydro resources which have remarkably constant flow.

FUTURE OF THE GAS TURBINE ENGINE IN THE AUTO INDUSTRY is still a matter of debate. One authority claims that above 60 mph the gas turbine shows a superior performance curve. Below that speed, conventional engines show much better results.

METAL BORIDES are being used with great success for pumps and nozzles handling molten magnesium and aluminum. Zirconium boride does not corrode or erode under these conditions.

SCRAP INSPECTION BY MILLS IS BECOMING MORE STRICT. Latest method for testing No. 2 bundles is to drill a hole, insert a gelatin type charge, and, by explosion, open the bundle for visual inspection.

MAGNESIUM DIE CASTINGS ARE NOW COMPETITIVE with aluminum die castings on a price-volume basis. Extensive use by the auto industry has resulted from the improved competitive position of magnesium. The industry is now the largest single civilian user.

TEST HEATS ARE BEING MADE IN A 1-TON ELECTRIC FURNACE by one alloy steel producer. Ingots are big enough to be processed in the normal way. This has advantages over the former method of using regular production furnaces which disrupted normal operations.

NONFERROUS LIGHTWALL TUBING PRODUCTION is scheduled to take a big jump this year. Five continuous induction heated welding mills are under construction. These mills will make aluminum and brass in all popular sizes from 18 gage and lighter strip.

PLANS TO MOVE ITS AUTOMATIC TRANSMISSION LINE TO CLEVELAND are being made by one auto producer. Once the move has been completed, the firm expects to increase production by about 80 pct.

SOME WESTERN RANCHERS ARE SUPPLEMENTING their income from cattle by trucking in manganese ore to the U. S. Bureau of Mines dump at Widden, Ariz. From there it is rail-shipped to refiners.

COLD SYNTHETIC RUBBER can now be made in about 20 minutes compared with the 12 to 14-hr production rate previously used, one manufacturer reports. Fast-acting formulas and a heat-exchanger that dissipates reaction heat have speeded the process.

NEWSFRONT — NEWSFRONT — NEWSFRONT — NEWSFRONT

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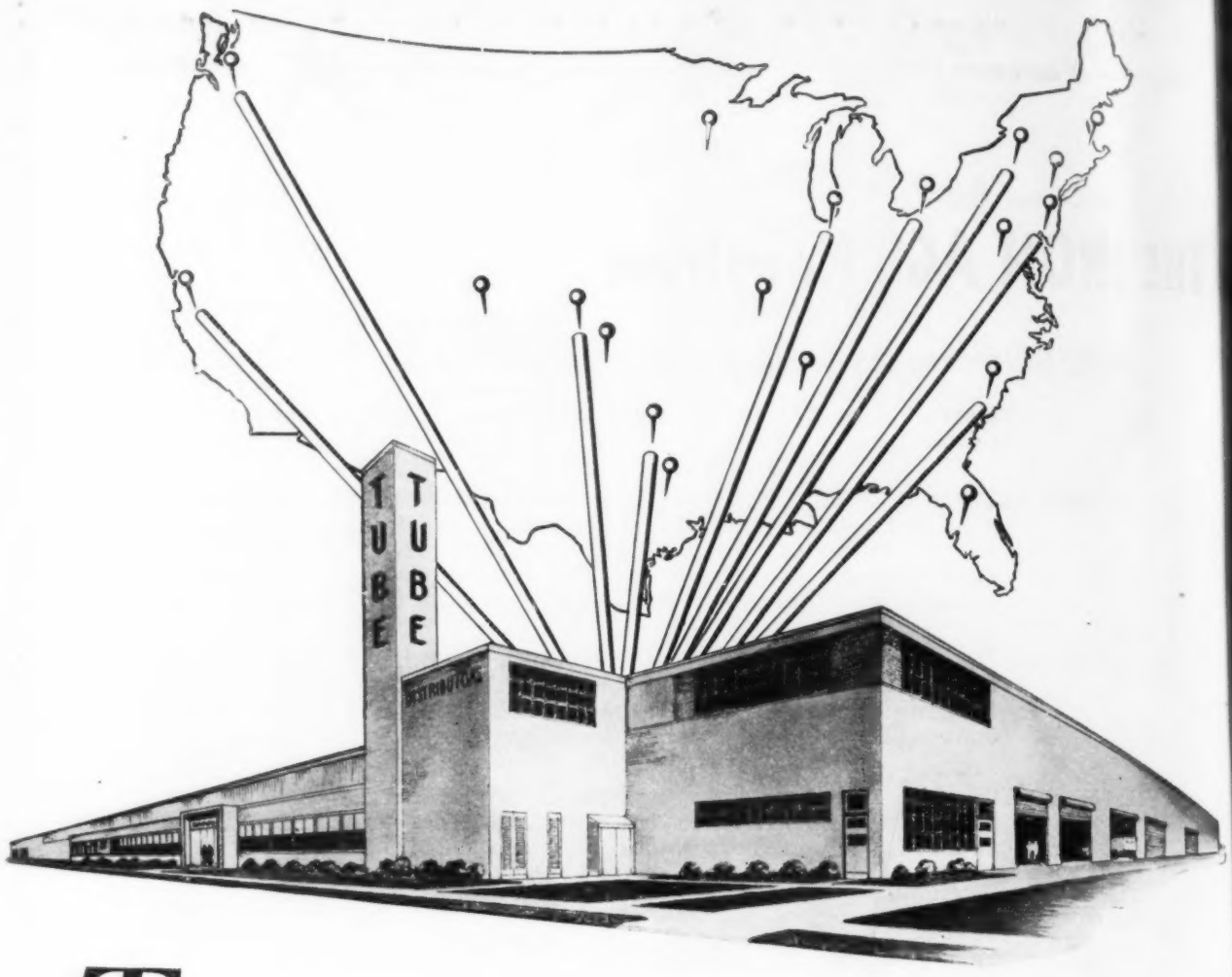


The plant that service built

It was with mingled emotions of pride and gratitude that we moved to our new plant in Garden City, New York. Our pride was the pride of fulfilling an ideal of which the plant itself is a symbol. And our gratitude was for you, our customers, who have made everything possible.

As we glance over the 50,000 sq. ft. of new warehouse space, one thought is uppermost in our minds. It is the thought that now as never before, the ideal of service to which our past has been pledged and our future dedicated, can be fully realized.

Yes, this is the plant that service built, service we hope to have the privilege of proving to you.

TUBE DISTRIBUTORS CO., INC.

GARDEN CITY, NEW YORK • Telephone: GArden City 3-5000

Warehouse Distributors: Alloy Stainless and Carbon Steel Tubing • Alloy Bars • Aircraft and Commercial Quality—Boiler Tubes

TD-101

FIRE: Can Send Your Profits Up In Smoke

Industrial blazes cost industry $172,750,000 in 1951 . . . Over $39 million destroyed by 88 outbreaks in 1952 . . . Analyze dangers, train workers for safety—By G. G. Carr.

Chicago was cold and bright the morning of Apr. 16. There had been mixed rain and snow about 4 hours earlier, but it had cleared by 8 a.m. when Haber Corp. employees reported for work at the four-story metal fabricating plant on the North Side.

Forty-seven minutes later a buffing machine belt slipped. Nobody knows exactly what happened next. Experts guess that sparks ignited aluminum dust in the air. There was no guesswork about the result: 34 dead, 29 hospitalized.

Cost Too Much

In terms of human lives, the Haber Corp. explosion fire was one of industry's worst in recent years. Fortunately most industrial fires don't take such a sickening toll. But 36,500 outbreaks cost $172,750,000 in 1951, reports National Fire Protection Assn.

Final figures haven't been compiled yet for 1952, but 88 U. S. and Canadian firms lost $39,327,000 in fires costing over $250,000 apiece last year. Breakdown by industry groups leaves big metalworking at the top of the list.

No Magic Formula

Histories of these "larger fires" show a frightening number of causes. There is no magic formula for fire prevention. Even more ominous is the lack of adequate fire prevention planning and firefighting equipment.

In 78 pct of these fires the buildings were of combustible or partially combustible construction. (Wooden roofs and joists were particularly frequent.) Sixty-six pct lacked enough fire walls, and 57 pct had open stairwells, elevator or conveyor shafts, just dandy for spreading fires from floor to floor.

Lack Was Notable

Flammable liquids aggravated flames in 32 pct of the plants. These showed up chiefly in processing equipment like dip tanks and in drum or can storage. "Lack of special hazard protection was notable," comments National Fire Protection Assn.

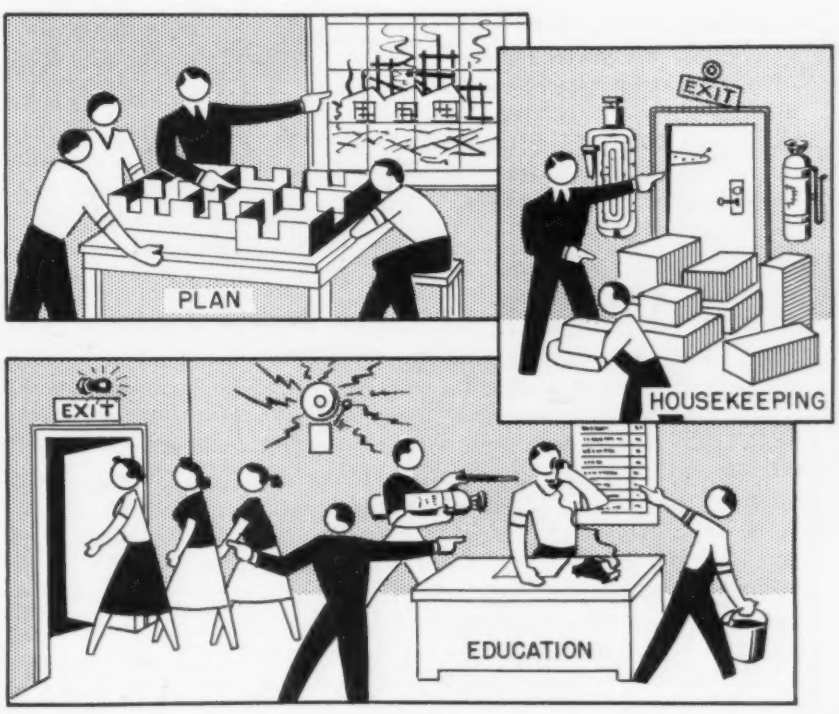
Complete prevention of all fires is obviously impossible, particularly with the human element always present. But sound basic procedure can minimize the danger and bring those fires that do occur under quick, safe control.

Management apathy is a prime cause of fire hazards, Gilbert E. Stecher, a leading fire prevention expert told THE IRON AGE. Mr. Stecher, author of the new book *Fire Prevention & Protection Fundamentals*, hastened to add that this doesn't mean management doesn't care about fire prevention. But protection doesn't just happen.

Analyze The Hazards

First step in any fire prevention system is an analysis of hazards. Expert advice may be necessary. Fire departments in most larger communities maintain a fire prevention bureau, with advice for the asking. Local Chambers of Commerce also frequently have fire prevention committees.

Where these are lacking or inadequate, fire prevention engineers, Underwriters Laboratory and National Fire Protection Assn. are all ready to help. And your



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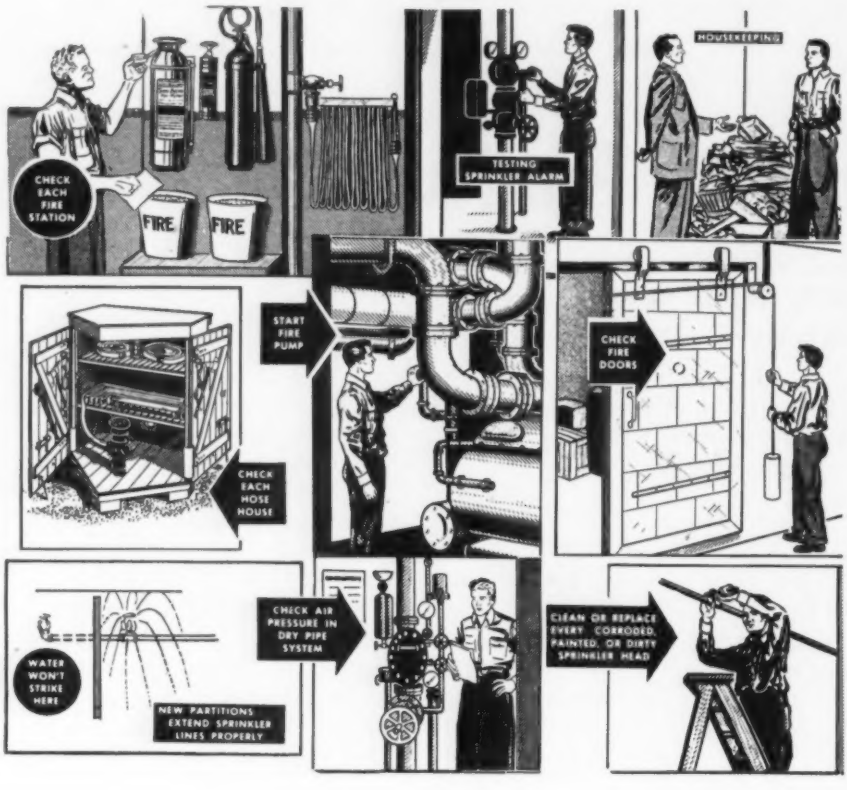

insurance company will be happy to have an expert go over your plant. All these groups have cooperated in setting up standards for different types of industrial operation.

Vapors Can Concentrate

Vapor and fumes, for example, are a generally acknowledged hazard. It's standard practice to keep them below the explosion level at point of use. But if not properly watched, dispersed vapors can concentrate at another location, with disastrous results.

An open 5-gal can of unmixed enamel was knocked over at a Peoria metal stamping firm one day last year. Vapors reached an adjacent gas-fired oven. Result: $550,000 fire damage. Management probably couldn't reasonably be expected to anticipate the danger; an expert would have underlined the risk of using volatile flammable liquids in that area.

The best fire protection, of course, is planned into a building in the blueprint stage. Here again expert advice is invaluable. Fire marshals' reports bristle with comments like "water pressure too low," "hose too short," "substandard protection system failed to function."

Plant diversification and shifts to rural or suburban locations carry two important riders in fire protection. Thirty-three pct of 1952's large industrial fires were in towns of less than 10,000.

Low tax rates are not the least of the charms of small towns. But low taxes often show up in small town fire departments and water supply. Doublecheck these facilities before moving.

Found Out in Time

The best equipment is no good without proper maintenance. Inspection of fire fighting equipment should be a commonplace part of housekeeping procedures. It cost an Ohio steel plant $775,000 last year to find out there was enough silt in yard mains to clog pump strainers, shut off water flow to hoses.

General tidiness itself is a valuable ally against fire. A gray iron foundry in Indiana paid a $423,000 parking ticket when a truck and crates of castings blocked the only readily available hydrant.

Storage areas should come in for special attention. Faulty wiring, spontaneous combustion, faulty heaters all have premium chances to do their dirty work in these locations.

Self-Propelled Drums

A Wisconsin metal finisher's store yard looked like a small boy's dream of the Fourth of July. Drums of solvent were wooshing into the air like sky rockets. The fires they started hadn't been serious, but company officials had heart trouble every time they looked out the window.

Reason: Heat of the sun was building up vapor pressure inside the drums to the explosion point. Solution: Aluminum paint the drums, put simple relief valves in the bungs. Much less dramatic, but a whole lot safer.

Expansion and repair work bring their own headaches. A shocking number of fires last year occurred because of temporary hazards resulting from construction work. Ironically, some jobs were installation of sprinklers and other fire prevention equipment.

Escape Cut Off

Modernization was a major cause of the Haber Corp. casualty list. The front fire escape and an interior staircase had been removed to facilitate renovation. No temporary exits had been provided, and the remaining fire escape at the rear of the building quickly became jammed.

And don't forget to reappraise hazards after any change in plant operations. New manufacturing methods often bring new dangers needing new corrective action.

In spite of your best precautions, fires will break out. Employee training is essential. Improved Risk Mutuals Insurance Co. estimates 95 pct of all workers have never used an extinguisher nor seen one demonstrated. Fire

drills may remind you of school days, but they're well worth the time and trouble.

Only designated workers should actually fight fires, but everyone should know how and where to give the alarm. If this sounds too elementary, consider the following sequence of events at a New York refrigerator plant last year.

Long Distance Fire Call

Twenty-five minutes after the watchman made his round, fire was discovered by an outsider who called a friend living 4 miles from the plant who in turn called a plant employee living 2 blocks from the fire.

The worker went to the plant to fight the blaze with a standpipe hose which didn't reach the flames. Finally a passerby pulled a fire alarm box just outside the building.

When the firemen finally got there, the wood roof was in flames, eventually buckled the steel framing. And the smoke eaters were handicapped by weak water supplies from two adjoining communities. Damage came to over $250,000.

Watch The Watchmen

After you've done all this you're probably ready to go home. But before you go you better have a talk with your watchman. Fifty-five pct of last year's large fires occurred during nonoperating periods. And only two watchmen performed their services quickly and efficiently.

Too many firms, particularly smaller shops, use watchmen's jobs in place of pensions. Protection requires prompt, positive action. Old Charley may be a fine chap, but he's a downright menace if he's reached the point where he can barely totter from station to station.

And training is even more important for watchmen than for other workers. There won't be anybody around to tell them what to do when they smell smoke at 2 a.m.

CORROSION: How Inco Fights It

Marine environments are among the most corrosive . . . Inco test stations study many materials under varied conditions . . . Even the corrosion lab's fence is checked.

Corrosion is a big problem. And International Nickel Co. is taking a big approach to licking it. Many environments in which metals must serve are extremely active and one of the toughest and most common is the sea.

Corrosive effects of seawater, sea spray and seacoast atmosphere are tested by Inco at Harbor Island and Kure Beach, N. C.

Tests are carried out under all conceivable sets of conditions, on all conceivable types of materials including many non-metals. Even the materials of which the test stations are built are carefully checked. The piles which support the sea water test racks, for instance, are all made of different materials or given protective coatings of different types.

Multi-Metal Fence

The chain link fence surrounding the laboratory consists of sections of galvanized steel, Monel, and aluminum. A section of the laboratory roof is Monel-sheet—with different areas welded by different methods.

A considerable amount of work is being carried on for the Navy, though in many cases this merely consists of storing equipment in the exposure racks. One example of this is a test being conducted to determine the best possible protection method for storing gasoline drums on future beachheads. In this case and some others the Navy is maintaining the records and Inco personnel don't even know what is actually under test on many of the samples.

Varies With Position

That careful evaluation of atmospheric test data is necessary is well illustrated by what Inco's Frank LaQue calls the "henhouse." This is a four-sided rack partially covered by an awning. Five samples of a given material are placed facing each of the four compass points. Each is protected to a different degree by the awning. Of the 20 samples of a single metal, corrosion rates sometimes vary as much as six to one.

Inspection tours were sandwiched in between technical sessions at last week's Harbor Island Castings Corrosion Conference. Discussions centered around aqueous corrosion and high temperature corrosion of alloy castings.

CORROSIVE EFFECTS of sea water are studied at Inco's Harbor Island marine laboratory. Foreground shows racks where samples are dunked. Racks are under test, too.

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MACHINIST: Will You Hire a Cripple?

Paraplegic is skilled machinist . . . Has shop next to home . . . But can't get jobs from industry . . . Wants to work but many polite refusals stretch courage thin—By *T. Metaxas.*

Nick Bell is losing much of his faith in private enterprise. He is turning sour on what he is beginning to interpret as a callous and selfish streak in our economic system—under which he has lived, worked and mostly prospered for 52 years.

Although a vigorous man like Nick cannot believe America owes him a living, he somehow feels betrayed that a man who is willing should not be permitted to work.

Has Machine Shop

If Nick were able to carry his machinist's skill inside industry's walls he could get a job tomorrow. But he can't do that from his wheelchair. In 1948 Nick walked into a hospital for a spinal operation and a year later wheeled himself out a paraplegic.

For 3 years he has written and telephoned industry executives and purchasing agents from his home at 301 Westport Ave., Norwalk, Conn., asking for work to do in the machine shop adjoining his home. A few sparse contracts have come his way, but in the main his persistent search for jobs has failed.

Still Has Skills

When Nick left the hospital he was crippled both physically and financially. But he had confidence in his mind and hands. The challenge wasn't a sporting one—but it meant survival.

But the many long months of hunting for jobs are bleeding the confidence out of him—while he suffers the indignity of having been made a useless man. Recently he had to sell his lathe while his wife went out to work.

In Nick's machine shop, built single-handedly by his son, are a 14-in. drill press, a grinder, a compressor, a flexible shaft, a bandsaw, a deburring tool. The lathe has gone for food but if he gets some work he can get it back on an installment plan basis.

With these tools and some help from his two sons and wife, Nick can do secondary machining operations and light assembly work. He can perform drilling, tapping, light lathe work, filing, deburring, chamfering.

POLITE BRUSHOFFS haven't killed Nick Bell's will to work. But so far nobody's given this skilled machinist much help.

Nick's experience has been extensive and practical. For a few years he was self-employed as a machinist subcontractor. He spent about 8 years as a worker, serving also as foreman of a drill press department and as a screw machine operator.

Disabusing himself of false pride after his operation, Nick logically asked help from rehabilitation agencies, federal employment bureaus, local chambers of commerce. He was treated to a series of morale building speeches and not much else.

Nick recognizes that his is more of a handicap than most. A blind man, a man with an artificial leg or arm can walk to work but Nick has to heave himself into his specially equipped car and cannot manage factory steps in his wheel chair.

With hope of getting help from congressmen or agencies snuffed, Nick culled names of executives and companies from phone books, newspapers, and trade journals. He tried to assert himself as an entrepreneur but the only thing he accomplished was to buy stamps by the sheet and pay $50 phone bills.

Regret that industry can give Nick no work is always expressed politely but in essence it means: "We wish we could help but it would be a real inconvenience to let you have work." Once promised that an "outside expediter" would call, Nick has been waiting 3 months.

"Many companies I write to don't bother to answer," Nick says. "In their way, they are being honest. By not answering, they admit they don't want to be bothered. I'm spared the soft soap of how sorry they are anyway."

The gist of many letters has made Nick aware that almost everyone will feel sorry for a crippled man. People may spill over with good wishes and genuine regret—but Nick hasn't yet met the businessman who will inconvenience himself to help.

Under guidance of a rehabilitation agency Nick recently found himself a correspondence student in radio repairing. But with television swiftly invading his area, and being unable to climb stairs or haul away radios, he feels he's wasting his time.

To Nick it seems that much publicized "Help the Handicapped" campaigns have stopped just short of himself and he wonders at the somehow ugly-sounding themes of magazine articles: "It pays to hire the handicapped."

"For God's sake," he says, "does it have to pay before you help the handicapped?"

EXTRAS: Steelmakers on Last Lap

Nearly all products have been covered . . . U. S. Steel's latest revision of extras involves forging ingots, blooms . . . Consumer makes headway in analyzing changes—*By J. B. Delaney.*

Steel producers have rounded the turn and are heading for the finish line in their revision of extras. Virtually all products have been covered, including tobacco hogshead hoop, although details of some revisions became available too late for publication this week.

U. S. Steel Corp.'s latest announcement involved carbon forging ingots, forging and rerolling blooms, billets and slabs, skelp, alloy plates, sheets and hot rolled strip, and alloy cold finished bars. Also affected are seamless and welded standard and line pipe, carbon and alloy seamless oil country goods, and carbon and alloy seamless pressure and mechanical tubing.

Consumer Makes Headway

With new extra cards piled high on his desk, the steel consumer is beginning to make some headway in his analysis of the changes as they affect him individually. Already, some users are uncovering bits and pieces that show the way to a change in buying pattern to minimize cost increases.

One such consumer who formerly used a 1020 bar has shifted over to 1015 and thereby saved himself a neat $2 per ton by avoiding an extra. More of this sort of thing will develop as shrewd P.A.'s shake down the new extras for all they're worth. The steel companies say more power to them.

The revisions undoubtedly will mean that some consumers will have to increase their prices to compensate. Industrial fasteners, for example, are giving serious study to the question of whether to put into effect higher prices even though they advanced prices only several weeks ago to cover previous cost increases. And staring them in the face is the probability of base steel price advances should the United Steel Workers win a wage boost in current labor negotiations.

HOT ROLLED CARBON STEEL SHEETS

Gage and width extras, coils—mill edge (72-in. and narrower) up $3 to $4; new extra in range of $10 to $13 for widths over 23 15/16 to 35 15/16 in.; over 72 in., up $1; cut lengths, up $1 to $2; cutting extras, up $1 to $2; restricted thickness extra, up $5; item quantity extras, up $10; revised table of order quantity extra; item extra for exact quantity, up $8; circles, up $2; revised table for sketches. Resquared extra, up 5 pct; stretcher level extra up $5; other processing extras, no change to up $3; heat treatment extras, up $2 to $5; quality extras, no change to up $2; specification extras, no change to up $2; specific and restricted test requirements, up $2; chemical requirement extras, no change to up $2; packaging extras, cut lengths and circles, no change to up $5; coils, no change to up $5; multiple lift package, up $3; hand bundles, up $2; wooden crates, up $10 to $11 per crate, strapping extra up 50¢; wooden boxes, up $15 to $16 per box, strapping extra up 50¢; special branding or marking, up $3 to $6.

HR CARBON STEEL PLAIN PLATES AND FLOOR PLATES

Plain Plates

Base changes in thickness, width, and length. Item quantity extras, no change; thickness extras, no change to up $3; width extras, no change to up $6; new odd gage extra of $3; revised table of even gages; length extras, unchanged to up $1; gas cutting extras, no change; heat treatment and surface finish extras, largely unchanged; restricted physical requirements, and chemical requirements, no change; specification extras, no change to up $5; special requirement extras and miscellaneous extras, unchanged; special marking, up $1.

Floor Plates

Extras unchanged; special marking table revised.

"I was doodling on a pad one day when the company psychiatrist had me transferred out of accounting!"

HR CARBON STEEL STRUCTURAL SHAPES

Base sizes revised; size and section extras—standard angles off $3 to up $2; exceptions, off $1 to up $10; standard beams, up $1 to $6; wide-flange beams, off $1 to up $2; wide-flange bearing pile sections, no change to up $1; light beams, joists and stanchions, up $1 to $6; H-beams, up $1; standard car and shipbuilding channels, revised table, some channels up $4 to $6; special car building sections, up $3 to $11; bulb angles, up $5 to $10; rolled tees, up $2 to $24; standard Z's, up $8 to $9; splitting extras, no change to up $2; length extras, no change to up $2; item quantity extras, no change; shipping, loading, cutting, cambering extras, unchanged; testing and specification extras, unchanged excepting federal specifications, up $1 to $11, military specifications, no change to up $13. Structural silicon steel, up $4 to $7. Special requirement extras, no change. Painting extras, up $1. Other extras, unchanged.

STANDARD TEE RAILS AND ACCESSORIES

Standard Tee Rails

Weight extras, no change to up $5; special sections, quality and use extras, no change to up $10; length extras, no change to up $15; quantity extras, no change; chemical extras, no change to up $4; oiling rails extra, drop testing extra both eliminated; loading extras, up $5 to $10 per car for special blocking.

Joint Bars

Weight extras, up $3; other extras unchanged excepting $2 increase for bundling and new quantity extra for quantities of less than ½ ton, $15.

Tie Plates

Extras unchanged, excepting bundling extras up $2.

LIGHT RAILS AND LIGHT RAIL JOINTS

Light Rails

Special section extras, unchanged to up $10; quality extras, up $5; quantity extras, up $1 to $2; length extras, up $1; drilling extras, up $1; notching extra of $2 eliminated.

Light Rail Joints

Quantity extras, unchanged to up $20.

COLD ROLLED STRIP AND SPRING STEEL

CR Strip (0.25 pct max. C and under)

Size extras—coils, off $14 to up $70 per ton. Size extras—cut lengths, off $44 to up $62 per ton. Quantity extras, up $10 to $300 per ton. Finish extras, no change to up $40 per ton. Coppered finish, up $7; hot-galvanized finish up $5 to $10; electrogalvanized finish (regular) up $5 to $10; hot-tinned finish, up $2 to $10. Edge extras, restricted width tolerance, thickness tolerance, length tolerance, and camber, no change. Special quality extra, up $2; special requirement quality, up $2. Chemistry extras, unchanged.

CR Spring Steel (over 0.25 pct to 1.35 pct max C inclusive)

Quantity extras, up $10 to $300 per ton; finish extras, up $20 to $40; edge extras, no change excepting new extras for No. 3 edge. CR spring steel in coils (over 0.25 pct to 0.40 pct C max inclusive) size extras, up $4 to $53 per ton; over 0.40 pct to 0.80 pct max C, up $6 to $53 per ton; over 0.80 pct max to 1.05 pct max C inclusive, up $6 to $53 per ton; over 1.05 pct max to 1.35 pct max C inclusive, up $6 to $53 per ton. Revised table of ex-

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tras for straightening and cutting to lengths 24-in. and longer; no change for under 24-in.

Tempered quantity extras, unchanged. Tempering and finish extras, up 5 to 10 pct. Size extras, up $6 to $53. Revised table for straightening and cutting to lengths 24-in. and longer; no change for under 24-in. Width extras, unchanged; extras for quantity and deductions for finish and hardness, unchanged; packing extras, unchanged.

ELECTRICAL SHEETS

Size extras, unchanged; item quantity extras, up $3 to $10; revised table of order quantity extras; exact quantity extra, up $8. Processing extras, core plated, up $6 to $10; deoxidized extra, up $4; new extra of $3 for outside inspection; pickling extras, cut lengths, up $3 to $17; width tolerances closer than standard, up $3; resquared extra, no change to up 5 pct; tension testing, up $2; packaging extras, cut lengths, no change to up $5; coils, no change to up $8; multiple lift packages, up $2 to $3; hand bundles, up $2 to $3; wooden crates, up $10 to $11 per crate, strapping up 50¢; wooden boxes, up $15 to $16 per box, strapping extra up 50¢. Special branding, up $3 to $6.

VITRENAMEL

Gage and width—11 and heavier, up $10 to $12 per ton; other gages up $2 to $3; length, unchanged to up $2; item quantity extras, unchanged to up $10; exact quantity, up $8; restricted thickness tolerance, up $5; circles, up $2 to $7; resquared extra, up 5 pct; new extra for outside inspection, $3; drawing quality extra, up $2; packaging extras, up $1 to $5.

LONG TERNES

Gage, width, length, and coating extras, unchanged; item extra for exact quantity, up $8; restricted thickness tolerance, up $5; stretcher level extra, up $5; resquared extras, up 5 pct, new extra for outside inspection, $3; quality extras, no change to up $5; packaging extras, cut lengths and circles, up 25¢ to $3.50; coils, up $2 to $8; additional packaging extras, up 50¢ to $11.

GALVANIZED FORMED ROOFING, SIDING AND ACCESSORIES

Gage and width extras, no change to up $5; length extras, no change; order quantity extras, no change; item quantity extras, no change to up $2; odd size item extra for exact quantity, up $8; new extra for outside inspection, $3; packaging extras, up 50¢ to $5; wooden crates, up 50¢ for strapping, up $10 to $11 per crate; wooden boxes, up 50¢ for strapping, up $15 to $16 per box; special branding or marking, up $3 to $6.

GALVANIZED FLAT SHEETS AND ALLIED PRODUCTS

Gage and width extras, up $5 for 16 gage and heavier; up $3 for 17 gage, up $2 for 18 gage, no change for 19 gage and lighter; length extras, unchanged; item quantity extras, unchanged; odd sizes, up $1 to $10; order quantity extra table revised; odd size item extra for exact quantity, up $8; circles, unchanged; new extra of $15 for tolerance closer than standard but not closer than 75 pct of standard; resquared extras, up 5 pct; stretcher level extra up $2; other processing extras, unchanged; quality extras, no change to up $2; miscellaneous extra for galvanized 2½-in. corrugated culvert sheets, up $5; USS galvannealed, gage and width extras, gages 26 thru 28, up $6; gages 23 thru 25 up $4; gages 18 thru 22 up $2; gage 17 up $3, and gages 14 thru 16 up $5.

BUYERS: Raise Little "Extra" Fuss

Purchasing agents wearing out pencils figuring new steel costs . . . Effect of extra increases varies widely . . . Many steel users plan to pass cost on to consumer—By R. M. Lorz.

Purchasing agents are scratching their heads and discarding pencil stubs in a hurried effort to find out what the bill for increased steel extras will be.

Calculations are involved and time consuming but fabricators who need steel to keep going are agreed on one thing: Their materials bill is going to be higher.

How much is still a matter to be determined by individual needs and possible effects of rearranged buying schedules. Sentiment on the extent of the increases ranges from screams of persecution to more moderate belief that new extras won't be too painful.

Some Users Hit Hard

In dollars and cents increases range from a few cents to $30 a ton and most firms are cautious about trying to determine how overall cost figures will be affected.

One automotive producer thinks his firm will be caught in the squeeze because extras are higher than expected and competition is rougher. "We were really surprised when we started totaling up the bill," he says. "We use a lot of carbon bars, sheets, and plate and in our case extra increases range up to a cent to a cent and a half per pound."

Same executive points out that his buying pattern will have to remain static because of the repetitive nature of operation.

Representative of another producer handling a heavy volume of automotive and aircraft business estimates steel costs in one of his firm's plants will be increased at least 9 pct. He believes the biggest jump will come in cold drawn wire which is costing his firm 10 pct more since extras were lifted.

Purchasing agent for one heavy machinery firm has a different headache. He is worried about warehouse prices on plates, structurals, and large diameter bars. Since his buying program normally includes a fairly heavy percentage of warehouse purchases he still doesn't know exactly what to expect costwise.

Passing Increase On

On the reverse side of the coin many stampers and automotive suppliers aren't losing any sleep over the extra increases. They reason that increases are justified and will have to be passed along.

Job stampers aren't too concerned because they have already begun to pass the increases along to customers buying job contract parts. Consumer outlook on proprietary catalogue items is more cautious; pass throughs to customers will probably be determined by industry-wide competition.

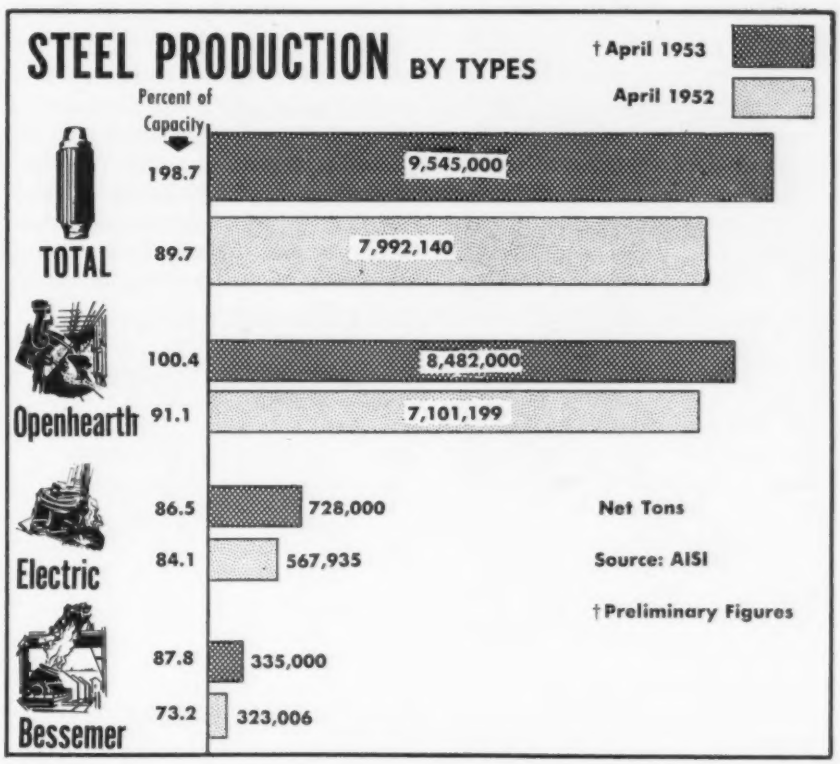
Summing up the total effect of extra increases isn't too difficult as final figures take shape. Most consumers admit they raised their eyebrows a little because overall costs were higher than expected. Once the initial surprise vanished majority concluded that increases were probably justified and would have to be sensibly incorporated in buying programs.

Maintain Normal Stocks

Some consumers will naturally take a much closer look at extra lists with an eye toward economical revisions in specifications. Once that has been done purchasing agents generally say they will maintain normal protective inventories.

Consumers who stand behind the mills in their desire to make every item pay for itself believe time for more economic firmness has come. Although there is some criticism of the timing on announcement of extra increases (just before labor negotiations) many steel users don't believe the action was ill advised.

President of one firm was terse in backing the steel companies on wages. His comment: somebody has to say " 'no' sometime."



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LABYRINTH OF CONVEYORS moves limestone from crusher to screening plant to storage yards to docks at U. S. Steel's Michigan Limestone Div., Rogers City, Mich.

LIMESTONE: Unsung But Vital Rock

Michigan deposits of iron fluxing agent among world's best . . . Played important part in steel center growth . . . Steelmakers start new quarries on Lakes shores—*By R. D. Raddant.*

Neglected in the drama of the steel industry ringing the Great Lakes is the part played by the vast limestone reserves of northern Michigan.

Steel's growth in Cleveland, Chicago and Detroit is generally attributed to location midway between Minnesota iron ore and bituminous coal deposits, linked by economical Lakes transportation.

It is seldom mentioned that these factors are supported by one of the world's richest limestone sources, considerately placed by nature at lakeshore where it can be transported to hungry blast furnaces at minimum cost.

Perhaps limestone's unglamorous role as a purging and fluxing agent for carrying off blast furnace impurities has led to its neglect. But at the rate of half a ton of stone for each ton of pig, the rock is a big factor in steelmaking.

The large deposit stretches along the shore of Lake Huron on lower Michigan's northeast shore. Known geologically as the Dundee limestone, its full extent has never been probed. But Great Lakes steelmakers are assured of a reserve that will give no concern for a long time into the future.

At present, most of the stone carried on the Great Lakes comes from the Rogers City operation of Michigan Limestone Div. of U. S. Steel Corp. Stretching for miles, this limestone quarry is the world's largest. Quarry, plant and dock are known collectively as Calcite.

Southeast along the shoreline, five major steel companies are joining forces to form Presque Isle Limestone Co. This new company will start digging in 1954 at another portion of the same deposit. Details are not final, but member steel companies have assured themselves of reserves.

Others In Area

In addition, several cement and chemical companies, also heavy limestone users, operate quarries or own reserves in this area.

Across Lake Michigan in the Upper Peninsula, Inland Steel Co. operates Port Inland, near Manistique, with an annual yield of about one-third of Michigan Limestone's 15-million-ton annual capacity.

Michigan Limestone recently announced a new operation at Cedarville, also in the Upper Peninsula, to produce about 3 million annual tons of dolomite, metallurgical quality limestone. This will also be in operation in late 1954.

To illustrate the quality of Michigan's limestone, stone from the Dundee outcropping has about 2½ pct impurities compared with 5 pct impurity for the limestone quarried and mined in Pennsylvania and West Virginia for Pittsburgh steelmaking.

As the pioneer, Michigan Limestone began its first shipments in 1912 as an independent company. U. S. Steel became its biggest customer, acquired the limestone company as a corporate division to insure continuing support for expanding steelmaking operations in the Great Lakes area.

Limestone In Steelmaking

Year	Net Tons Charged
1952	5,029,479*
1951	5,672,509
1950	5,510,256
1949	4,663,526
1948	5,355,905

*Preliminary Source: AISI

FIFTEEN-STORY screening house in photo at right sorts limestone from quarry according to end use at Michigan Limestone Div. More than 15 million tons is processed yearly here, then, below, loaded on stone boats.

But Michigan Limestone's capacity is not earmarked entirely for U. S. Steel's blast furnaces. About half its yield goes to steelmaking, with other large tonnages for the chemical and lime industry and the cement industry. Balance is used in sugar beet processing, papermaking, soil conditioning, and road construction aggregate.

Founders of the Presque Isle Co. are Republic Steel Corp., Great Lakes Steel Corp., Bethlehem Steel Co., Youngstown Sheet & Tube Co., and Jones & Laughlin Steel Corp. Officers are officials of the parent companies.

Presque Isle will do its digging at a site once held by the Kelley Island Lime & Transport Co. of Cleveland. This company, one of the oldest limestone producers, developed the Kelley Island and Marblehead quarries in Ohio. These resources are now exhausted or approaching exhaustion.

Mechanize To Compete

Considering its low cost to the consumer (about $1 per ton), limestone operations require large capital outlays. Strong competition makes a high degree of mechanization necessary.

Michigan Limestone runs closely integrated operations at its Calcite plant in Rogers City. The division supplies 8 basic grades of stone with 45 variations, depending on size and chemical analysis.

Huge electric shovels load the limestone into one of a dozen trains of cars that serve the quarry. Each hopper car is dumped into a gigantic crusher. From there, conveyor belts take the stone to the 15-story screening house for sorting. After grading it is moved to storage, then by conveyor to the stone boats.

Michigan Limestone operates a fleet of seven self-unloading stone boats, largest and newest of which is the 666-ft *John G. Munson*. The boats were developed by the limestone industry to serve customers without unloading facilities.

The *Munson* itself will carry 2 million tons of stone in 1953. The entire line carried 8 million in 1952.

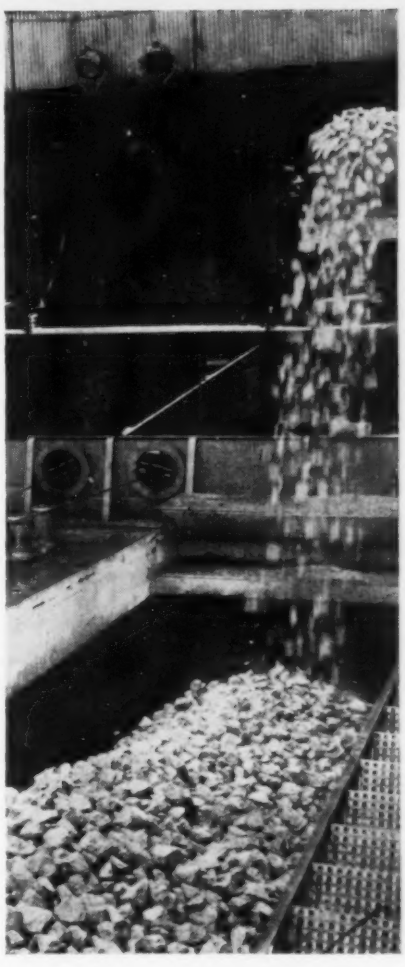
An historical note is that some of the early shovels used in the Calcite quarry were brought in from Panama Canal digging and were used into the 1930's.

Presque Isle Co. intends to install facilities similar to those at Calcite, complete with crusher and loading facilities.

The Calcite operation is practically the sole support of the Rogers City community. With stripping going on during the winter, quarrying is not a seasonal operation, but a year-round job. Even the stone boat sailors are employed throughout the winter in maintaining the fleet, which is based at Rogers City.

Limestone producers may suffer a little from an inferiority complex. They know they do a good job, particularly in making their commodity available at a low price, but think their role in supplying the steel industry doesn't get the credit it deserves—it probably doesn't.

Their product has to be mined, crushed and sorted, and shipped in the same type carrier as iron ore.



Yet it commands only roughly one-eighth the price, and even a smaller fraction of the glamor of iron ore.

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—Expansion—

TINPLATE: Fastest

New facility in operation at U. S. Steel's Pittsburg, Calif., plant . . . Now hitting 900 fpm.

The fastest operating high speed electrolytic tinplate line in the U. S. currently in production of sheared tinplate was unveiled last week.

This part of U. S. Steel's $30 million expansion at Pittsburg, Calif., is now hitting 900 fpm on 0.25 lb electrolytic tinplate after about 5 months initial operation. The plant is building stock for canning.

The new facility represents 68 pct increased capacity in sheet and tin mill products, is identically rated with the Fairless Works electrolytic line not yet in full production. Kaiser's line, also rated at 1000 fpm with 1200 capability, is being broken in more slowly at about 600 fpm by new help.

Workhorse of the expanded Pittsburg mill is the new 4-stand 3500 fpm cold reduction mill. This is taking the load off the existing 5-stand mill previously rolling both sheet and tinplate.

Second Pickling Line

New allied equipment includes a second continuous pickling line, additional annealing furnaces, side trim, recoil and slitting lines, continuous galvanizing line testing equipment and 10,000 tons extra storage capacity for hot rolled coils from Geneva Works.

Not an eastern blueprinted mill by any means, the new facility incorporates many innovations by the local plant engineering force. Notable is Weary Willy, an open sided pinch roll for threading.

Suggested by a Pittsburg Works executive and patented in March, it features a top roll operating on a tilting fulcrum. Top roll is raised so strip can be threaded through or inserted from the side, then lowered hydraulically and inched through by a 5-hp motor.

The edge trim baler uses telescope-type shock absorbers to hold down the top roller. In conventional units this bounces 6 to 8 in. constantly and is subject to breakage.

ne in Production

iggest dividend however is 50 pct reater density of scrap trim bales ideal for the openhearths.

Good erection methods gained rom experience on the earlier mill y J. H. Pomeroy Co., San Fran- sco contractors, resulted in no lignment troubles — usually a eadache with new sheet and tin ills.

RADIOACTIVE SUBSTANCE in capsule is used to measure thickness of tinplate.

Waste sulphuric acid from the new continuous pickler is gathered in a 6 x 6 ft underground tunnel eliminating bulky overhead accumulators. Water is steamed off and waste acid barged 12 miles out to sea to avoid stream pollution.

The new mill is the second major expansion at Pittsburg works since inauguration of the first tinplate unit in 1948. With the new Kaiser tinplate mill it represents a major advance in the West's effort to catch up with tinplate consumption.

But basic ingot-making capacity is still short. Two small openhearths in an adjacent Defense Plant Corp. ordnance foundry at Pittsburg were used until only recently for extra output. Ingots were shipped to Geneva, Utah, at substantial freight cost, rolled to coils then re-shipped to West Coast plants.

new Willson

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combining ***eye protection*** *with the* ***color styling*** *workers want today!*

Style WB—choice of new spatula temples as shown, or half-plastic, half-cable type temples. Style WBS—has matching bronze sideshields.

Not one, but *two* new features make these sturdy safety spectacles an exceptional value. Their distinctive bronze color gives them a pleasing appearance. And the new non-flammable frame is toughest plastic made for spectacles—won't chip, crack or craze—and has greatest shock resistance.

Willson Bronze styles feature the "keyhole" bridge and popular Hi-Line® temple. Brand-new wire core spatula temples add an extra comfort feature you'll welcome. They're easy to adjust for a perfect fit!

These attractive spectacles are available with Super-Tough® heat treated glass lenses or Willson Plas-Tough® plastic lenses. A full range of eye and bridge sizes make these spectacles ideal for use with prescription lenses. See your nearest Willson distributor for these new Willson Bronze styles—or write for descriptive bulletin.

For those who prefer flesh-colored plastic spectacles, with the same safety and comfort features and choice of temples, see Style WK and Style WKS.

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FOREMEN: Put Them on Executive Team

Most management agrees that foremen should be treated like executives . . . But many of them aren't . . . Foremen's Institute explains what should be done . . . What foremen gripe about.

Have you been to a management conference recently? Chances are that if you have, you probably heard someone give a talk on the importance of foremen, pointing out that they ought to be part of management and should be treated like executives.

Seldom is anyone unsophisticated enough to disagree with these tried and true precepts. It's in putting them into effect that the trouble arises.

It's Not Enough

Many executives pride themselves on being on a first-name basis with the plant foreman. They make it a careful point to ask him about his kids—even split a beer with him between innings of the marrieds-singles softball game at the company outing.

But this condescending good fellowship does not make a foreman part of management, nor is it even effective deception.

Does He Belong

In a recent report, the National Foremen's Institute lists three factors which determine whether a foreman is truly part of management: (1) If his superiors treat him as though he were, (2) if the men under him regard him that way, (3) if he believes he belongs in the management group himself.

It's through working relationships in the plant that management can add the foreman to its staff. The foreman should have authority to make decisions on plant operations, and policy changes should be hashed over with him before they are arbitrarily put into effect.

Keep Him Informed

The foreman should also be kept informed of the company's external operations such as sales and advertising, capital investments and competitive standing. Some firms have found it helpful to give foremen a daily digest of the painstakingly clever memos that are passed around by company executives, so that the foreman will know what's going on and be assured that he belongs.

What the men who work under a foreman think of him is just as important as management's view. All foremen are in a difficult position because there is always a certain amount of friction between a supervisor and the people who work for him. Workers are quick to pounce on any slip that will take the boss down a peg.

What Are The Gripes

The Foremen's Institute states that one of the most common grievances among foremen is management's practice of bypassing the foreman, who is the company's management representative, for the shop steward.

Other frequent complaints are that management does not back the foreman in cases where disciplinary action is needed, and that executives, while respecting the niceties of their own hierarchy, storm onto the shop floor and give orders to the first worker they see.

Nothing lowers a foreman's prestige more than having to answer a worker's question with an evasive "I'll have to check with the boss." Supervisors should be in a position to make their own decisions.

Break In New Workers

To start new workers off with proper respect for their supervisor, the foreman should be responsible for the major part of the orientation process. And if management has any reason to criticize a foreman, it should be done behind closed doors.

The foreman's own feelings depend upon the way he is regarded by both workers and management. If he is treated like an executive on both levels, he will think and act like one.

Since labor is one of the most expensive raw materials used in any plant, a foreman's ability to make people work is his most important function. His success in developing high productivity depends largely on his ability to handle people.

Checklist For Success

The National Foremen's Institute has a checklist with which management can determine whether a foreman is doing his job. The answers are also a tip-off on whether management has been successful in making a foreman an executive.

The key questions are: Is every worker in the job best suited to him? Is supervision calm, friendly and firm? Are employees properly trained? Are workers enthusiastic and proud of their company? Are inter-department conflicts settled easily?

"No" answers indicate that the foreman is not doing his job successfully and that production costs are probably higher than they should be.

Unless management has made a poor selection in choosing men who have no potential for leadership, foremen can be made more effective by giving them management status.

Inspection

Scrap:

Bethlehem's explosive way of inspecting No. 2 bundles.

Ever since the steel scrap market started declining several weeks ago inspections have been getting tougher and rejects are reported high. No. 2 grades have been hit especially hard.

Now Bethlehem Steel Corp. has come up with an explosive method of checking No. 2 bundles that is interesting to say the least. A demonstration was held for a large group of steel people in Bethlehem, Pa. recently.

Explosion Shows All

An eye witness described the method like this: A hole is drilled half way through the bundle and a 30 pct gelatin-type explosive charge is inserted. When the charge is set off, the bundle is opened up to show exactly what's in it. However, the bundle is not destroyed and if the material is good it can be charged into the furnace.

Bethlehem developed the method for spot-checking cars of bundles. Some other steel firms are reported considering adopting it for their scrap inspection.

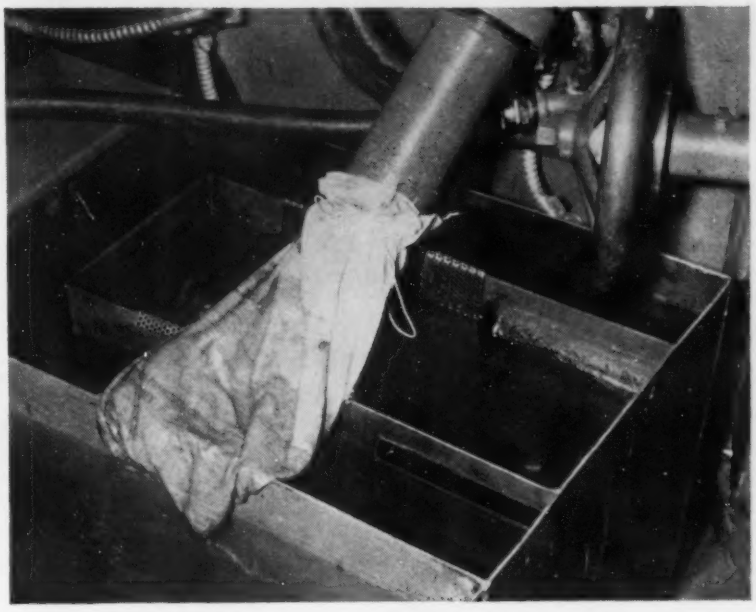
Has Trade Buzzing

Steel people who witnessed the demonstration included scrap buyers, openhearth operators, scrap inspectors, and others. The scrap industry was not represented. The new inspection method and what it revealed inside the No. 2 bundles had the trade buzzing as far away as Pittsburgh.

Scrap people hate rejections like the plague. Always costly, they are doubly damaging if material has been shipped considerable distance and has to be disposed of by "distressed" sale. With the market soft, and inspections getting more rigid, they are increasing their vigilance on quality.

Many scrap consumers maintain that quality of No. 2 bundles started deteriorating during the shipping rush inspired by the shortage in 1951.

Salvage



DIAMONDS ARE SAVED by tying a cloth bag around exhaust end of coolant pipe leading from machines which grind carbide tools with diamond grinding wheels.

Simple Method Saves Diamonds at Carboloy

An ordinary sack may be the answer to greater diamond salvage in industry.

At the Edmore, Mich., plant of Carboloy Department of General Electric Co., a common cloth sugar bag is the main "component" of a simple method of salvaging diamonds from grinding sludge—recapturing enough diamonds in a month to have them made into four or five additional grinding wheels at nominal cost.

The bag acts like a coffee strainer. It's tied to the exhaust end of the coolant pipe leading from the machines which grind cemented carbide tools with diamond grinding wheels. When other types of grinding wheels are used on the same machines, the bag is removed to allow the coolant and non-diamond sludge to go into the regular coolant reclamation system.

When the bag is used to trap the diamonds from grinding sludge the coolant flows on through the regular reclamation system. But instead of having to clean out all the sludge from reclamation tanks and processing it for diamond particles, the bag saves only the sludge coming from the diamond grinding wheels. Salvaging diamonds from mixed sludge is difficult and in many cases too costly to pay off.

Firms using this system have a choice of either selling the salvaged diamonds for roughly $1.50 per karat to the company doing reclaiming, or just paying for reclamation service and having the diamonds returned. So far Carboloy has found it more to its advantage to have the diamonds returned and made into diamond grinding wheels.

Users of industrial diamonds were relieved to learn that National Production Authority last week removed controls over crushing bort, diamond powder or dust, and unreclaimed diamond material, by revoking order M-102.

The order had been in effect for 14 months and required that all consumers, dealers and other diamond holders report on a monthly basis their receipts, inventories, sales and other transactions.

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DMS: Establish Steel Procedures

NPA issues rules for regulating steel output and distribution . . . Producers, converters must reserve mill space for military, AEC needs . . . Some controls will run past June 30.

National Production Authority has issued a set of rules for regulating production and distribution of steel for military and atomic energy purposes under Defense Materials System when CMP expires June 30.

Designated as order M-1A, effective last Friday, the new regulation in effect discards all government control over carbon, nickel bearing stainless, and alloy steel products after June 30, reserving only the power to direct production and delivery of items needed for defense and atomic energy.

Must Reserve Mill Space

Under the order, producers and further converters must reserve mill space for authorized controlled materials orders bearing the A-B-C-D-E plus digit ratings.

Meanwhile, continuation of "limited" controls over some steel products after June 30 was brought up at a meeting between the steel products industry advisory committee and NPA officials.

But NPA said there was no intention of changing the new order M-1A to provide any control whatsoever except for defense needs.

They declared that the steel industry has already reached the capacity goal of 118 million ingot tons ahead of schedule. There is no doubt, it was held, that the 1954 target of 120 million tons will be attained—making civilian controls unneccesary.

Users Get More Freedom

Under Friday's order, manufacturers may obtain nickel bearing stainless for the third quarter for permitted uses by means of unrated as well as rated orders. However, both types of orders must bear compliance (under M-80) certification.

A production directive committee will be retained by an iron and steel industry unit in the new Commerce Dept. set-up. It will issue monthly production and allocation directives to the steel industry with reference to defense setasides.

Third quarter directives will make use of a new base period, the first quarter 1953 production directive base tonnage.

Also, acceptance of rated orders must continue from the date of opening order books until beginning of product lead time, up to the tonnages covered by their production directives. Such orders must be accepted or rejected promptly. In no case can they be held more than 10 days without action.

The iron and steel unit must be notified by telegram immediately when a producer has accepted orders to the amount of tonnage covered by his directive should this occur before beginning of the next lead time.

Warehouse rules for all steel products, previously covered by M-6A have now been merged into M-1A. Subject to certain exceptions in the order, distributors must take all rated orders.

Renegotiated Pigs

Any variation in the iron content of products now must be taken into account by contractors and subcontractors subject to U. S. renegotiation regulations in computing their cost allowances for pig iron.

The U. S. Renegotiation Board makes this clear in its new Staff Bulletin No. 19, "Computation of Cost Allowances for Pig Iron." The bulletin explains in detail how an integrated steel producer should compute its cost allowance for pig iron, and how the Renegotiation Board will apply the statutory factors to a contractor permitted such a cost allowance.

On and after July 1, distributo will be allowed to replace invento used for military and atomic e ergy orders by use of the allotme order D-8 which will accompan orders to regular suppliers. Th symbol may not be used to repla one product by another.

Contracts Reported Last Week

Including description, quantity dollar values, contractor and ad dress. Italics indicate small busi ness representatives.

Casing, burster, 233800 ea, $218,62 Arndt Metalcraft Corp., Trenton, N. J.

Detonator relay, 48270, $35,029, E. I duPont de Nemours, Wilmington, Del.

Signal, flash & sound, M74, 1413673 ea, $1,078,610, Bayshore Ind., Inc., Elkton, Md.

Adapter, grenade projection, 5800 units, $345,100, George K. Garrett Co., Philadelphia.

Airplane crash crane, (522-43), 2, $61,878, R. G. Le Tourneau, Inc., Peoria, Ill.

Ice cream making equipt condensing units, 98, $383,103, The Bastian-Blessing Co., Grand Haven, Mich.

Propulsion generator, 10, $453,264, General Electric Co., Washington.

Sleeves for VT fuze, 190000, $381,900, The New Britain Mach. Co., New Britain, Conn.

Sleeves for VT fuze, 110000, $190,300, The Weatherhead Co., Cleveland.

Mine fairing, 1222000, $1,194,628, Talcott Screw Machine Products, Inc., Meriden, Conn.

Launcher, grenaded, 65216, $377,600, L-M Mfg. Co., Inc., Roseville, Mich.

Lock, gas cylinder, 65216, $84,128, L-M. Mfg. Co., Inc., Roseville, Mich.

Grinder, tool & cutter, 1, $57,270, Brown & Sharpe Mfg. Co., Providence.

Lathe, turret engine, 19, $219,222, Gisholt Machine Co., Madison, Wis.

Jet engine test stands, 7, $138,573, General Motors Corp., Indianapolis, *H. S. Bowden.*

Hydraulic oil pump test stand assys, 70, $758,930, Sprague Engrs. & Sales Corp., Gardena, Calif.

Carburetor, 1914, $2,583,900, Bendix Aviation Corp., South Bend, Ind, *G. I. Lyman.*

Engine assy, 870 ea, $66,451, Continental Motors Co., Detroit.

Shot, API, 20 MM, 3300000 ea, $1,749,000, Pantex Mfg. Corp., Pawtucket, R. I.

Primer, percussion, 151700, $103,156, Trifari, Kurssman & Fishel, Inc., Providence.

Spring, shorting clip for rocket, 9181000 ea, $82,629, Eastern Tool & Mfg. Co., Belleville, N. J.

Shell, HE, 4.2" mortar, 622002, $78,000, Scaife Co., Oakmont, Pa.

M12, Mine, AT, heavy practice, $167,692, American Bantam Car Co., Butler, Pa.

Cartridge, ignition M8, 540000 ea, $164,160, Bayshore Industries, Elkton, Md.

Transmission w/gear shift hand lever assy, 2500, $121,825, Borg-Warner Corp., Muncie, Ind.

Transmissions, 402, $3,363,038, General Motors Corp., Indianapolis, *H. S. Bowden.*

Case, cartridge, 535000, $5,082,500, Globe American Corp., Kokomo, Ind.

Lighting fixture kits, 900 ea, $114,975, Grimes Mfg. Co., Urbana, Ohio.

Indicator, 1079, $199,349, Bendix Aviation Corp., Teterboro, N. J.

Indicator, 566 ea, $58,874, General Electric Co., Schenectady, N. Y., *W. H. Bobear.*

Indicator, 4484, $515,637, R. C. Allen Business Machines, Grand Rapids.

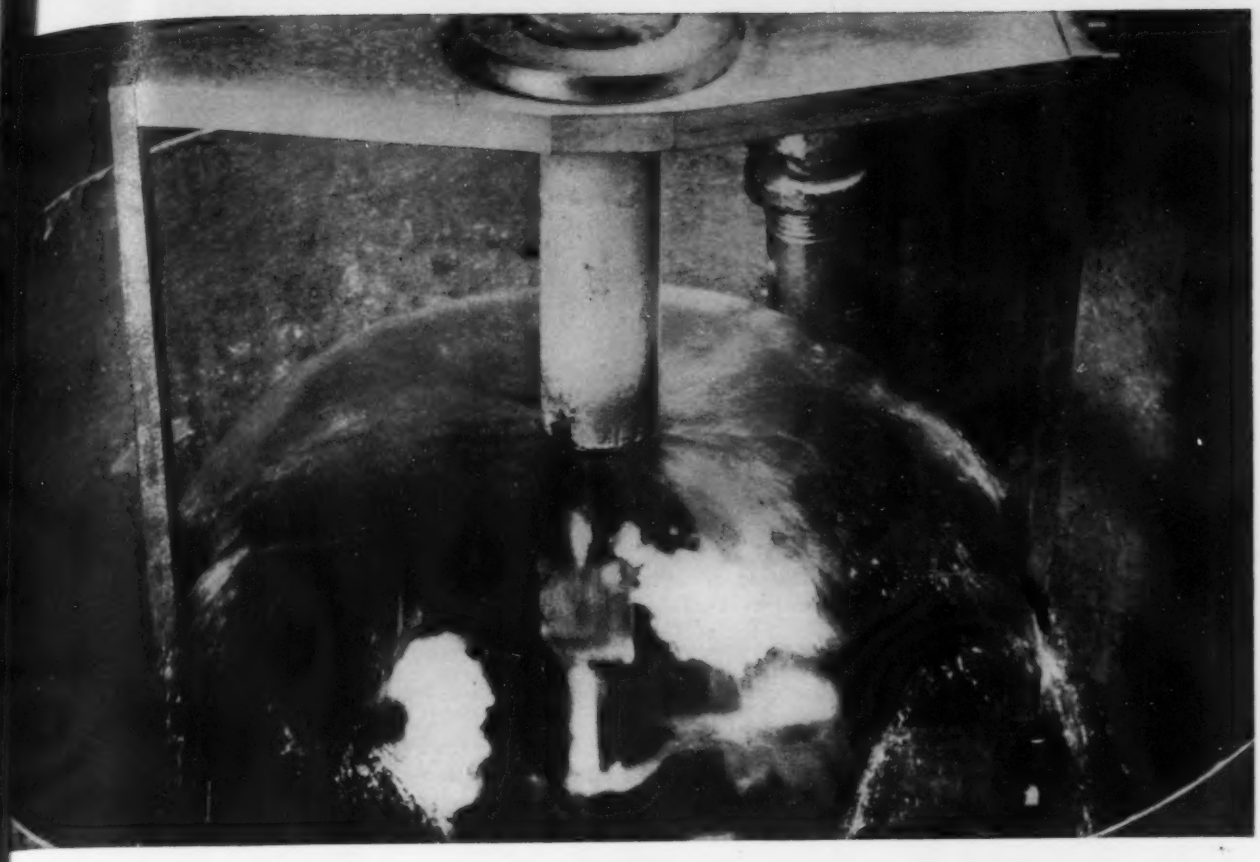
Automatic pilot, $70,530, Sperry Gyroscope Co., Great Neck, N. Y., *George A. Dennis.*

Camera, $209,319, Mitchell Camera Corp., Glendale, Calif.

Regulators, 441 ea, $103,877, Westinghouse Electric Corp., Dayton.

Tank assy, 5000 ea, $1,079,780, Seeger Refrigerator Co., St. Paul, Minn.

Generators, 492 ea, $607,369, Westinghouse Electric Corp., Dayton.



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One million tons per year—

That is the rate at which boron steels are now being produced with multiple-element Vancoram GRAINAL ALLOYS.

Reasons: GRAINAL'S *unmatched effectiveness and dependability.*

GRAINAL ALLOYS give maximum benefits with significantly less boron than any other boron-containing alloy. Steels made with GRAINAL may contain far smaller amounts of the critical alloying elements—because GRAINAL ALLOYS replace these elements with respect to hardenability.

GRAINAL gives remarkably consistent results and can be incorporated with no major changes into any conventional steelmaking practice.

For complete information on Vancoram GRAINAL ALLOYS, *write or call your nearest Vanadium Corporation office today.*

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SAND CORES *Really* COST?

Oil-sand strainer core costs include oil, sand, binder, labor and overhead. But don't stop there—those cores are costing you plenty in reject losses, faulty castings, and slow production! AlSiMag Ceramic Strainer Cores save a lot of money right down the line—fewer rejects, better castings, and faster production. It's smart business to use AlSiMag Strainer Cores.

- Strong, will not break in handling
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- Completely free of gas
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TEST THEM YOURSELF—FREE! Ask us for free samples of sizes in stock; test them in your toughest conditions, highest temperatures. See for yourself how AlSiMag cores can save you money.

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AMERICAN LAVA CORPORATION

51 YEARS OF CERAMIC LEADERSHIP

CHATTANOOGA 5, TENNESSEE

Industrial Briefs

Roll On . . . BIRDSBORO STEEL FOUNDRY & MACHINE CO., Birdsboro, Pa., designed and built the new uranium rolling mill which was put into operation at Fernald, Ohio, recently for the Atomic Energy Commission.

New Factory . . . MINNEAPOLIS-HONEYWELL REGULATOR CO. will open a new factory at Warren, Ill., to expand the production of its Micro Div.

Formed . . . EUTECTIC WELDING ALLOYS CORP., Flushing, N. Y., has formed a Canadian company to be known as The Eutectic Welding Alloys Co. of Canada, Ltd.

Magnesium Distributor . . . THE A. R. PURDY CO., INC., Lyndhurst, N. J., has been named by the Dow Chemical Co., Michigan, as sole eastern distributors of magnesium.

Stepping Ahead . . . GEORGE SALL METALS CO. has erected its plant with practically every action scientifically controlled for maximum output. One of the more unique metal plants in the country, it will be officially opened for operation the end of this month.

Touring Europe . . . Christy A. Wiken, vice-president—research & engineering, ROCKWELL MFG. CO., left last week for Europe for a 3-month tour of industrial plants in nine nations.

Fourth Edition . . . NATIONAL SCREW MACHINE PRODUCTS ASSN. released the fourth edition of its Buying Directory recently. It lists the facilities and services of all member companies, and also contains a Statement of Policy to Customers which has been subscribed to by all members of the association.

Machine Tool Project . . . Armour Research Foundation of ILLINOIS INSTITUTE OF TECHNOLOGY will send Engineer George D. Thomas to Pakistan this month to assist in the modernization of that nation's machine tool industry.

Houston Branch . . . FIRTH STERLING, INC. has opened a branch office in Houston at 1102 Prudential Bldg., 1100 Holcombe Blvd.

Sales Up . . . BRAD FOOTE GEAR WORKS, INC., Chicago, and its wholly owned subsidiaries, report net sales for the 6 months ended Mar. 2[illegible] 1953, up 10 pct from last year.

Indiana Office . . . THE METAL CARBIDES CORP. has opened a sales office at 325 Bankers Trust Bldg., Indianapolis.

Joins Staff . . . William N. Brinker recently joined the staff of the PORCELAIN ENAMEL INSTITUTE, Washington, D. C., as administrative assistant.

Big Moment . . . The millionth car to be built by CHRYSLER CORP. in California is scheduled to roll from the Los Angeles assembly plant on June 17.

Under Way . . . RYAN AERONAUTICAL CO. is working on new contracts received from the Navy Bureau of Aeronautics for airborne electronic equipment.

Touring U. S. . . . Frank Hurn, director of SMITHS OF ENGLAND, arrived here recently for a series of conferences that will take him around the country. Smiths of England is a leading manufacturer of automobile instruments and equipment.

Big Order . . . ACF-BRILL MOTORS CO. received an order for approximately $4.5 million in 105-mm gun recoil mechanisms and ammunition from the U. S. Army Ordnance Corps.

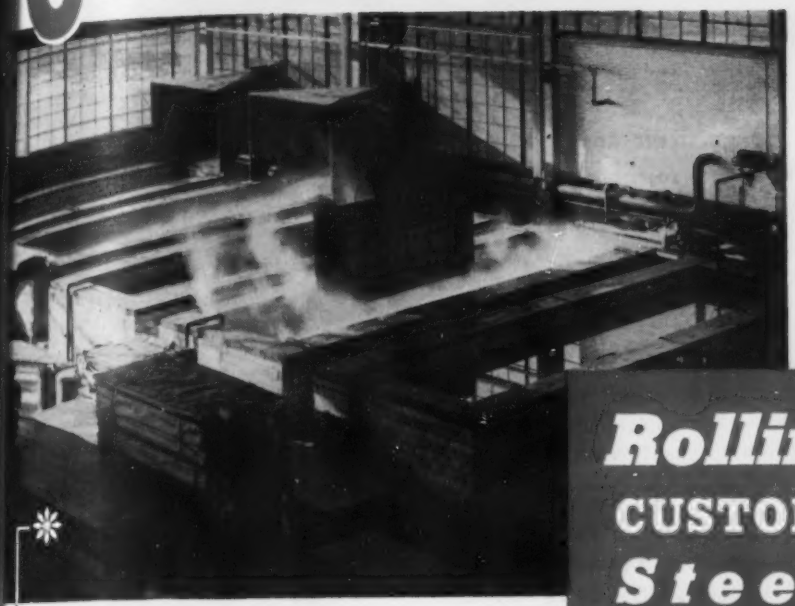
Established . . . CAMBRIDGE APPLIED RESEARCH, INC., 60 White St., Belmont, Mass., is a newly established independent laboratory.

Hear Ye . . . TRACERLAB, INC., Boston, has opened two new branch offices, one in Atlanta at 1844 Stanton Rd., East Point, and in Cleveland at 4614 Prospect Ave.

New Prexy . . . WIRE REINFORCEMENT INSTITUTE has elected Donald M. Schmid, assistant general manager of sales, Truscon Steel Div., Republic Steel Corp., president for 1953.

Gondola Cars . . . PRESSED STEEL CAR CO., INC., received an order for 500 70-ton drop-end mill-type gondola cars from the Sante Fe R. R.

Custom Steel Service*



Rolling Our Own CUSTOM Steel Strip

Pickling tanks in our Seneca Buffalo warehouse are shown above. All 3 of our plants, Detroit, Chicago and Buffalo, are equipped with the latest type cross-ventilated tanks to give you fast delivery of pickled and oiled steel in sheets, plates, bars and coils (cut to length if desired).

* Roller leveling too, annealing, shearing, slitting and skin rolling.
* Steel strips in coils and cut lengths . . . restricted tolerances, all tempers and finishes.
* Warehouse stocks in sheets, plates, coils and cut lengths . . . all tempers and finishes.

For quick "Custom" service on sheets and strip steel call our nearest warehouse or sales office.

Fingertip QUALITY CONTROL, electronically operated, gives this 4-high, reversing type cold strip mill unusual flexibility in supplying *cold rolled steel strip* to your EXACT SPECIFICATIONS. Thicknesses .025 to .125 in all tempers, and in either bright or satin finish, are processed to your exact width in coil or cut lengths. Tempers ranging from dead soft to full hard, controlled by annealing and skin passing.

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Phone: TWinbrook 3-5000

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Phone: TWinbrook 3-5000

PRODUCTION STEEL COIL, INC.
20001 Sherwood Ave., Detroit 34, Mich.
Phone: TWinbrook 3-5000

PRODUCTION STEEL CO. OF ILLINOIS
2801 Roosevelt Rd., Broadview, Ill. (Chicago)
Phone: MAnsfield 6-4242

SENECA STEEL SERVICE, INC.
1050 Military Rd., Buffalo 17, N. Y.
Phone: Riverside 7920

SALES OFFICES:

PRODUCTION STEEL COMPANY
1002 E. 81st Street, Indianapolis, Ind.
Phone: Broadway 3468
E. W. Richardson, Sales Representative

PRODUCTION STEEL COMPANY
548 W. Mechanic Street, Jackson, Mich.
Phone: 2-9097
Glenn Christman, Sales Representative

PRODUCTION STEEL CO. OF ILLINOIS
7521 West Dixon St., Milwaukee, Wisc.
Phone: BLuemound 8-8323
Warren P. Bidwell, Sales Representative

SENECA STEEL SERVICE, INC.
739 Westchester Ave., Rochester, N. Y.
Phone: Culver 7480
W. J. Knoll, Sales Representative

SENECA STEEL SERVICE, INC.
1347 Northcliffe Rd., Syracuse, N. Y.
Phone: 73-5722
Dean Hethington, Sales Representative

SENECA STEEL SERVICE, INC.
347 Price Street, Jamestown, N. Y.
Phone: 5759
S. N. Olmsted, Jr., Sales Representative

PRODUCTION STEEL COMPANY
1040 High View Lane, Green Bay, Wisc.
Phone: Howard 7407
Tony Canadeo, Sales Representative

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Car Coolers Give Auto Men Headaches

Strong potential market seen for auto air conditioners . . . But price is still high . . . Units not suitable for assembly line installation, slow production—By *R. D. Raddant.*

For $600 the well-heeled Texas oilman this summer can drive his car across the torrid plains of the Southwest in perfect comfort—providing he has under the hood of his car a General Motors, Chrysler or Lincoln air conditioning unit.

This symbol of the Southwest millionaire as the only type of person who can or even wants to have an air conditioned car is one that manufacturers would like to destroy, and with some reason. Customer research indicates that there is a much wider potential market.

Deductible . . . The price, $595 for a Chrysler unit and $594 for GM, (price of the newly announced Lincoln unit has not yet been set) automatically gives the oilman impression. But another factor to consider is that the real market may be among salesmen, doctors, or others who spend a lot of their time on the road and, most important, can charge off the cost to business expense.

The market, of course, will determine the eventual position of the air conditioner in the auto industry. At the same time, some of the problems of manufacture and installation have yet to be worked out. Their solution may result in a compact, easily installed and inexpensive unit that will wipe out the wealthy oilman symbol and replace it with that of a conventional family or businessman.

Installation Is Headache . . . An interesting point to consider is that 3000 cars were specially equipped with air cooling before World War II, and since the war about 7500 more were added. As early as 1939 Chrysler had a good system. Since the war material shortages and more basic problems of production kept air conditioning interest at a low apathetic ebb until very recently.

One of the reasons why air conditioning cannot be sold at a lower price is that its installation defies mass production assembly techniques. Not self-contained, its components extend from front to rear, are independently mounted, then inter-connected for operation.

Automotive Production
(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
May 16, 1953...	150,230*	27,788*
May 9, 1953...	149,075	30,546
May 10, 1952...	102,190	28,347
May 3, 1952...	101,520	28,425

*Estimated Source: *Ward's Reports*

An excellent comparison, accredited to H. V. Joyce of Ford Motor Co., is with the car's brake system.

Off The Line . . . To get this installation cost down, air conditioning units may eventually be scheduled for final assembly line installation. Another alternative is off-line installation with partially completed vehicles pulled off the line for air condition unit installation.

Dealer installation is a third possibility, but not very practical. A car destined to be supplied with air conditioning requires too many special adaptations to be economically performed at the dealer level.

In the GM for example, air scoops are built in by Fisher Body, but the system itself is not installed on the line. Cars that are to receive air conditioning are pulled off into a special section. Chrysler does about the same.

Too Big A Problem? . . . Whether this will ever be replaced by on-the-line installation is still a question. It is possible that an air conditioning unit, complex as it is, may always be too big a problem for the final line, unless the number should become great enough that the unit is the rule, rather than the exception. Otherwise they would tend to interrupt the line, the worst crime that can occur in an assembly plant.

GM with its Frigidaire Div. and Chrysler with Airtemp launched their air conditioning units early this model year. Chrysler and DeSoto, and Dodge in the near future, can be fitted with the unit as can Cadillac, Oldsmobile and Buick among GM divisions. Lincoln will have its own unit soon.

Still To Be Solved . . . Frigidaire engineers point out that the elements of a basic system are the same. They include: Refrigerant, source of power, compressor, condenser, liquid refrigerant control, evaporator, fans and air distribution system and temperature and miscellaneous controls.

A packaged unit would weigh from 150 to 200 lb. How to install these elements without ruining established car design features and still keeping installation costs down presents problems that are only partially solved.

It is a safe guess that when they are, the unit will be a lot less complex and a lot less expensive.

Jockey For Position . . . Back in the pack in the auto race some spirited jockeying is going on as auto companies try to gain or hold their positions.

Win, place and show money are sure to go, in this order, to Chevrolet, Ford and Plymouth. Buick, a consistent fourth place runner, is not too far out of the money, although it wouldn't be wise to bet on Buick to show this year.

Running Order Changes . . . Latest registration figures show some revisions in the order of running from a year ago. Some of these represent trends that may result in permanent glee or gloom to respective managements. Others

represent temporary setbacks or fast starts that may be overcome before the finish of 1953.

Registration figures lag well behind production figures in tabulation, but latest registration and production totals at this point carry the same place position.

After Buick comes Pontiac in fifth, in its last year's position, but in sixth place is Oldsmobile, replacing Dodge, which was running in that position a year ago. Behind Dodge, now in seventh, is Mercury, which also climbed up a notch into eighth position. In ninth is Nash, a position that represents an advance from eleventh. Chrysler is tenth, where it was a year ago, but Studebaker is in eleventh, a three place drop from eighth.

Next changes are in back of the pack where Packard jumped from fifteenth to fourteenth at the expense of Hudson. Willys went from seventeenth to sixteenth and Lincoln from eighteenth to seventeenth.

Here are the four months' production totals based on *Ward's Automotive Reports:*

Chevrolet, 490,112; Ford, 343,262; Plymouth, 218,015; Buick, 175,091; Pontiac, 142,822; Oldsmobile, 122,032; Dodge, 120,954; Mercury, 85,998; Nash, 75,239; Chrysler, 67,085; Studebaker, 60,460; DeSoto, 47,600; Cadillac, 41,333; Packard, 40,979; Hudson, 36,585; Willys, 22,333; Lincoln, 15,586 and Kaiser-Frazer, 15,306.

Watch Auto Installment Buying

A close eye is being kept on automotive installment buying by both credit conscious government officials and the auto industry particularly at the dealer level.

Auto credit buying was pinpointed in a recent Federal Reserve Board report. It showed that in just the month of March auto credit jumped $313 million. Total consumer credit buying in the same period increased $422 million, indicating the amount of installment buying that is accounted for by auto purchasers.

Those who favor a conservative credit policy point to the auto first when they suspect too much credit extension.

Under the strict terms of Regulation W, only 50 pct of auto buying involved credit buying against a normal figure of 75 pct.

Motor Shows:

GM Motorama and Parade of Progress to canvass U. S.

Just about every person in the U. S. will get a chance to see one of General Motors' road shows this year. Whether he lives in a hamlet or a city of millions, either Motorama or the Parade of Progress will be within transportation distance.

Motorama is the new car show coupled with engineering and non-automotive division exhibits. It also has a stage show of top professional talent. Motorama is hitting the top population centers.

Last week the Parade of Progress officially opened in Dayton after a short shakedown. Unlike Motorama, the Parade of Progress is a scientific show that displays no GM product. It will hit medium size cities from coast to coast.

The Parade of Progress is a revival of the road show that ran from 1936 until World War II. It is operated by 55 young men, includes a 40-min stage show of science presented in the Aerodome, a fireproof tent designed without poles. The caravan features 26 major exhibits displayed in GM Futurliners, 33-ft long vans with sides that open to reveal exhibits and to form small lecture stages. Ten tractor-trailers, four other trucks, and 18 new passenger cars complete the Parade.

Lights Get Lit Up on New Cars

If a car owner wants his car really well illuminated, he can have as many as 38 separate light sources in his luxury 1953 model.

Even the average new car owner has about 20 lights in his 1953 model. Val J. Roper, General Electric automotive light engineer, reports that the number of lights in a new model is four times what it was in 1925.

THE BULL OF THE WOODS — By J. R. Williams

I DIDN'T SHOW HIM A THING-- HE DID IT ALL HIM-SELF! IT'S A SCALE MODEL OF THAT 440-TON CRANE!
I'LL BET TH' BULL O' TH' WOODS IS WONDERIN' IF HE EXPECTS THE KID TO STEP OFFA THAT TOY INTO A BIG JOB HERE, 'STIDDA GETTIN' INTO SOME OVERALLS AND EXPERIENCE ON TH' BIG ONES!
I DON'T KNOW WHY THEY BRAG SO LONG AND LOUD ABOUT COMIN' UP TH' HARD WAY, THEN WORK SO HARD PUSHIN' THEIR KIDS UP TH' SOFT WAY!
THE CONTRADICTION
5-22 J.R.WILLIAMS

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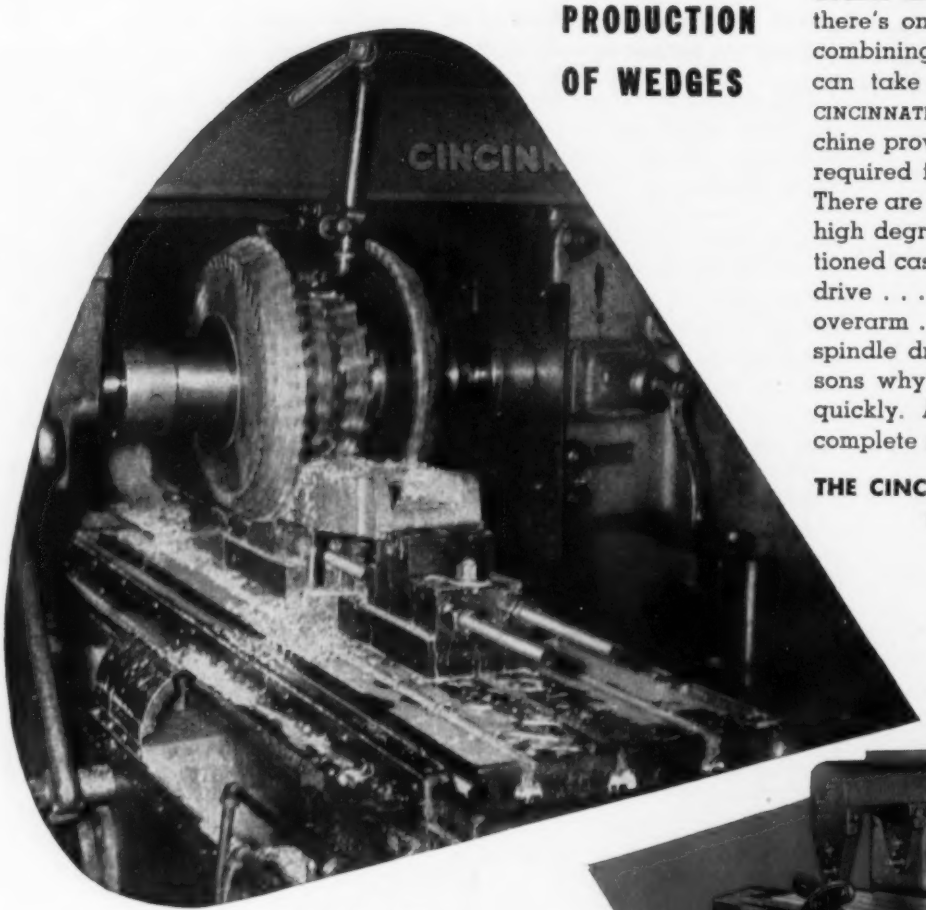
"Ganging Up"

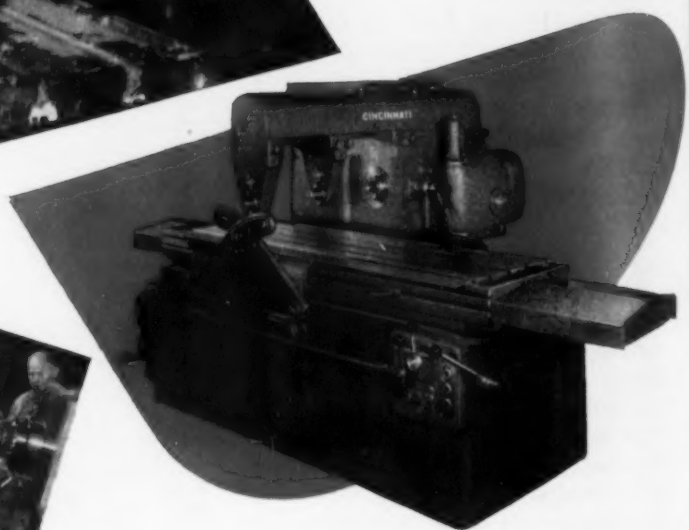
FOR MULTIPLE CUTS DOUBLES PRODUCTION OF WEDGES

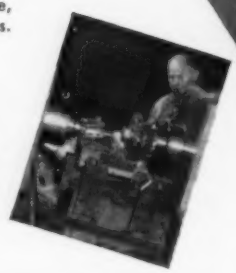
Why take five cuts, when one will do the job? That must have been the question asked of themselves by the shop personnel of the Southern Pacific Company, for they designed a gang of five large cutters to mill five surfaces of locomotive brass wedges in one pass. Production jumped to double the previous method. ¶ Of course, there's one little catch to the practice of combining cuts—you need a machine that can take the load. In this example, a CINCINNATI Plain Hydromatic Milling Machine provided all the power and stamina required for the heavy cutting operation. There are several reasons for Hydromatic's high degree of cutability: heavily proportioned castings throughout . . . up to 50 hp drive . . . Dynapoise vibration damping overarm . . . only four gear contacts in spindle drive. There are many other reasons why Hydromatics can cut metal so quickly. Attractive catalogs give you the complete story.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO



CINCINNATI Plain Hydromatic Milling Machine, equipped with a special gang of cutters and an air operated fixture, to mill five surfaces of brass wedges.





Write for catalog No. M-1670-1 for the Plain and Duplex machines. Or catalog No. M-1602-1 for the Plain and Duplex Tracer Controlled Hydromatics.

CINCINNATI Hydromatic Milling Machines are available in Plain and Duplex styles, conventional and tracer controlled types, 18 sizes of each, 24" to 90" table traverse, 10 hp to 50 hp drive, standard and complementary unit construction for flexibility in building single purpose machines. No. 5-60 Plain machine illustrated.

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MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING MACHINES
FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

Seaway Chances Rated Best Ever

Chances of approval in 1953 rated best in 40 years . . . But pressure for economy, plus opposition of railroad, coal people still rated as very hard to beat—*By G. H. Baker.*

U. S. participation in development of the St. Lawrence Seaway is closer to reality this week than at any time during the past 40 years. Although it's still too early to state that 1953 is the year Congress will finally vote its approval of U. S. entrance into the huge shipping and power project, three new developments during the past week point up the firm backing for international sponsorship of the project that is now gaining strength in Washington:

(1) Unanimous endorsement by President Eisenhower and his entire Cabinet of a government report finding that U. S. participation is "highly desirable," provided it is limited to the International Section (between Lake Erie and Montreal) of the St. Lawrence.

(2) Tentative approval by the Federal Power Commission of the New York State Power Authority's application for a 50-year license to build and operate a hydro-electric project in the International Section. Under this plan, New York will join with Canada in building the Long Sault Dam near Massena, N. Y. Generator capacity: 940,000 kw. Cost: $316 million.

(3) Reaffirmation by Prime Minister St. Laurent of Canada that his nation definitely "is not bluffing" when it says it will build the seaway with or without U. S. help.

Opposition Still Strong . . . White House-backed plan calls for the U. S. to join with Canada at an early date in building a channel through the International Section. Investment, amortized over a 50-year period, would be paid off by collection of shipping tolls.

This backing, substantial as it is, may not be husky enough to put the seaway over in Congress this year. Growing pressure for economy in government expenditures, plus last-ditch opposition from railroad and coal interests, could push the program over to the '54 congressional docket.

Slow Depreciation Shuffle . . . Tinkering with depreciation rates is at an end. Federal Bureau of Internal Revenue, acknowledging that there's been much confusion over amortization rates applying to machinery, plant equipment, and other industrial property, ruled on May 12 that rates are not to be altered unless there is a "clear and convincing basis for change."

The new ruling does not mean that Congress will not re-write the basic amortization laws in the months ahead. Treasury Secretary George M. Humphrey has made it clear that he intends to submit proposed changes in depreciation policy to Congress. But these proposals may not be unveiled for several months.

Can Forecast Rates . . . Effect of the new Bureau of Internal Revenue ruling is to put an end to the practice whereby one BIR agent would fix depreciation rates for a company, only to find a second agent ordering different rates. Rates frequently were changed from year to year, with the result that many firms found it impossible to forecast their depreciation allowances in advance.

The new policy is designed to end such conditions, as well as the recurring disputes between manufacturers and the government. The rates are to "stay put," unless either side presents a convincing case for alteration.

May Restore Census Funds . . . Manufacturing and transportation circles, indignant over loss of U. S. census funds in the House of Representatives, are blaming Secretary of Commerce Sinclair Weeks for making a "poor case" to Congress for the necessary appropriations.

Truman budget for fiscal 1954 called for appropriation of $21 million for census of transportation and other industries, and the proposed expenditure was endorsed by the Republican-controlled staff of the House Appropriations Committee. But House members say Mr. Weeks hedged his approval and was unprepared to answer questions on the subject in testimony he delivered.

Chances are good the Senate will restore part, if not all, of the $21 million request, but economy-minded House members declare they won't endorse such a move. Result, if the funds are not finally voted: No transportation or industry census, or resulting market studies compiled from it.

Fast Tax Write-Offs Open

Fast tax write-offs are still available to small businesses expanding their plants to meet new federal goals for mining machinery, materials handling equipment, and ordnance facilities.

Other production fields still open for accelerated amortization include coke and by-products, sensitive electrical switches, and alkylate compounds.

Research and development laboratories now holding defense contracts may also get certificates to help them expand.

Interested firms should apply by filing application form DPAF-2 with Resources Expansion Div., Office of Defense Mobilization, Washington 25, D. C.

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PIPELINE: Try For New Record in '53

Industry hopes to lay 10,000 miles of line this year, 40 pct over last year's record . . . But expansion program lags . . . Plate shortage, steel strike hurt—By *A. K. Rannells.*

This year's pipeline construction is well on its way to a new high level, with good chances of exceeding last year's all-time peak figure by 40 pct or more. Outlook for next year is bright.

As it looks now, on the basis of reported expansion plans by the industry and increasing availability of steel, about 10,000 miles of new transmission and gathering oil pipelines will go into place during 1953.

Still Goal To Go

This would be nearly one-half as much again as last year's record-breaking 6800 miles. It would also raise total U. S. major pipeline mileage to 173,000 miles—some 12,000 miles short of current expansion goals.

From an overall viewpoint, the expansion program is lagging and will fall short of the target date by at least 1 year. But 1953 prospects are in sharp contrast with actual pipeline construction 2 years ago.

Plate Lack Hurt

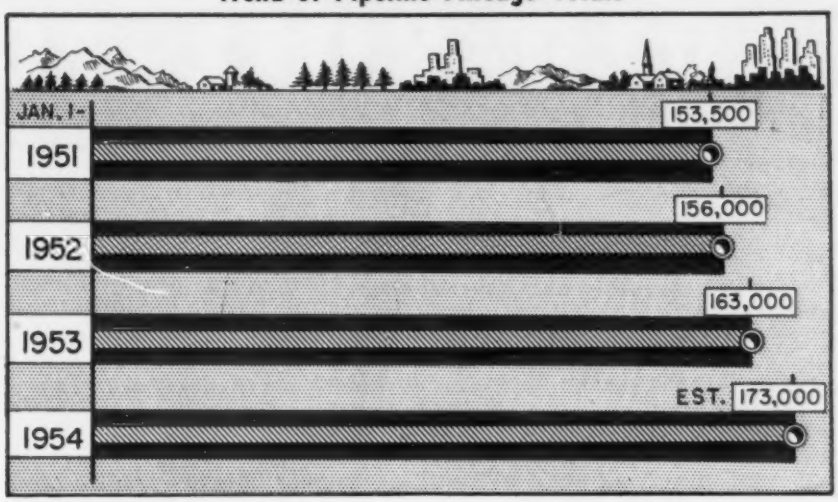
Average mileage laid during the 5 immediate postwar years (1946-50) was about 3825, one-third of which was constructed to handle petroleum products as opposed to transport of crude oil.

Stepping up of expansion plans with the advent of the Korean crisis was hampered by development of a shortage of plate steel for line pipe. New construction in 1951 dropped below even the postwar average—down to a low figure of 2866 miles.

Early in 1952, on basis of surveys by Petroleum Administration for Defense of defense requirements, mobilization agencies established 185,000 miles as the probable pipeline mileage which would be needed by 1954. This meant adding about 31,500 miles to existing pipelines.

At that time, Defense Production Administration believed it could issue enough defense priorities to permit laying of more than 19,000 miles during the 18 months prior to the target date. This meant 7700 miles during last half 1952 and 12,000 miles during 1953.

Trend of Pipeline Mileage Totals



What little chance there was of meeting this schedule was knocked into a cocked hat by the steel strike. But despite shortages something like 6800 miles were laid last year—a new record in itself.

Looks Good

Prospects are much happier this year. Officials concede, however, that in spite of improving pipeline availability, industry will be lucky to get 10,000 miles of new pipeline into place—some 2000 miles short of the original expansion estimated for 1953.

Nearly 40 major projects, involving about 10,000 miles of new pipeline and costing more than $450 million, have been scheduled for completion during 1953. These range from short loop lines of less than 50 miles to bigger projects such as the 643-mile lakehead line from Superior, Wis., to Ontario.

Barring some unforeseen obstacle, chances are good that the new 10,000-mile record will be set. Some of the major projects well under way at the start of 1953—such as Sinclair's 666-mile line from Oklahoma to Indiana and the 580-mile West Texas line from Colorado City to Longview, Tex., have already been completed to add to the year's mileage score.

Nevertheless, there will be 12,000 miles of the expansion program to be met after next December, since completions now in sight will bring the nation's pipeline total to only about 173,000 miles.

There is no plan pending now to increase the present expansion goal. But there is a general opinion that in view of growing demands and probable increase in tidelands activity, a great deal more expansion will be in sight.

Cut Air Base Construction

Eliminated from Air Force plans because of the Administration's reduced military budget recommendations is construction at 14 air bases which would have cost some $155 million.

Largest project affected by the cutback is the $46 million strategic bomber base scheduled for Portsmouth-Newington, N. H.

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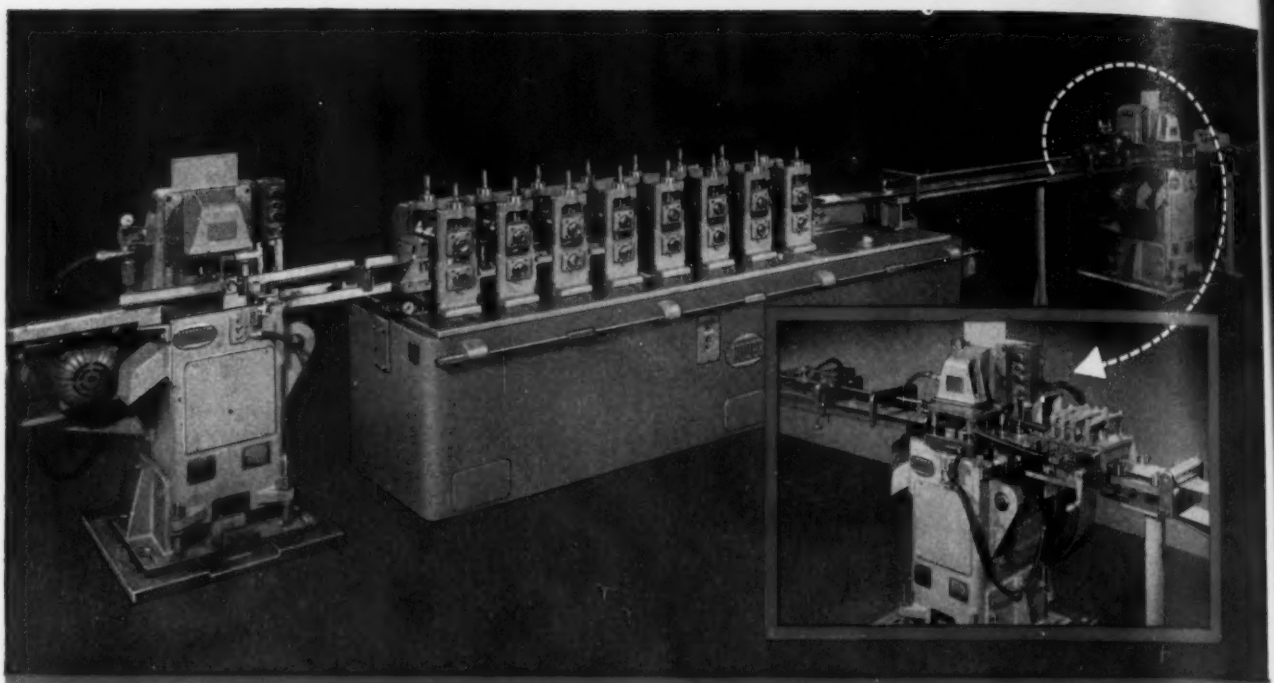

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Mills Roll More Tinplate for West

U. S. Steel expands sheet, tinplate facilities at Pittsburg . . . Total western tinplate output about 525,000 tons yearly . . . Still 350,000 tons under area use—By T. M. Rohan.

Western steel is jumping into the sheet and tinplate market with both feet this year.

Latest step was taken last week when U. S. Steel unveiled its new $30 million sheet and tinplate mill expansion at Pittsburg, California. (See page 80.) Expansion consists principally of a new 4-stand cold reduction mill and a second high speed electrolytic tinplate line. Combined tinplate capacity, including hot dip, is about 350,000 tons.

Booked to Capacity . . . The U. S. Steel expansion, coupled with the $25 million Kaiser mill, dedicated in January and rated 200,000 annual tons, brings total western tinplate capacity to about 525,000 tons annually. Actual output lags somewhat, and both mills are booked to capacity this year.

But the two combined are still short of annual western tinplate consumption of about 875,000 tons. U. S. Steel ships in about half of what it sells in the West from midwest and eastern plants and Weirton and Bethlehem are also heavy suppliers from eastern mills.

Columbia-Geneva Div. President Alden Roach said at plant ceremonies last week that demand for flat rolled products continues to offer the major western market. Any future expansions will undoubtedly be in that direction.

Auto Market Grows . . . Auto production based on increased population offers a definite new market, he added. This has largely bypassed western steelmakers so far because production did not justify economical local stamping.

Auto frame production, however, appears a distinct possibility based on mounting freight, local steel availability and feasibility of comparatively low output plants. One San Francisco machinery firm recently indicated research showed frames could be built in the West for $9 under delivered price from Detroit, which is a big margin in the auto production business.

More Tool Steels . . . Increased western tool steel sales brought a new Carpenter Steel Co. warehouse to the San Francisco area last week. President Frank Palmer of the Reading, Pa., firm, said sales by the industry to metalworking plants have gone up spectacularly in the last nine months and no fourth quarter letdown is in sight.

Hottest western item is matched sets for tool and die shops, ordnance plants, and captive tool rooms, with aircraft plants taking about 20 pct of the total. Customers are largely supplied from the firm's larger Los Angeles warehouse.

Expand Capacity . . . The recently introduced "Vega" air hardening tool steel is also selling well. Corrosion resisting stainless steels for valves and fittings, especially in refineries, show increased potential. One significant stumbling block, however, has been inventory speculation which throws production by manufacturers out of line.

Nationally the firm's sales in the last three quarters are $40.3 million or 16 pct over the like period last year. Currently the specialty steel producer is spending $2 million on a new hot rolling mill at Reading, Pa., and tube expansion at Union, N. J. Production backlog is 3 months and customer demand is described as being "somewhat less" than it was a few months ago.

Defense Boom . . . Military orders just keep rolling in to the Hall-Scott Div. of ACF-Brill Motors at Berkeley, Calif. The firm totted up $15.5 million last week with receipt of two brand new contracts.

Latest orders are $2 million for LVT boat transmissions and $4.5 million for 105 mm howitzer recoil mechanisms. Extensive special tooling will be required for the recoil mechanisms at a cost of about $3.6 million, much of which will be subcontracted.

Crash Boat Contract . . . Other major defense contracts held by the firm are $4 million for Navy crash boat engines and $2 million for tank retriever engines.

The crash boat engines are 700 hp V-12 units, based on the 6000 World War II PT boat power units which were turned out by the firm then.

The tank retriever is a 6 cylinder in-line design developing about 600 hp. Remainder of the firm's production is in custom-built commercial buses, ambulances, etc., marine engines and truck power units.

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Imports, Exports Flourished in '52

U. S. metalworkers bought almost $50 million foreign tools last year . . . Exports at $125 million mark . . . Predict slump in imports . . . Try for more exports—By *E. C. Beaudet.*

Imports of foreign machine tools reached a record high during 1952. Slightly less than $50 million worth of foreign-made equipment reached American shores last year, according to a recent report of the Dept. of Commerce.

In 1951 machine tool imports totaled $13.7 million. The great upsurge in 1952 was made possible by the flood of defense orders following Korea. Heavily loaded backlogs of American firms provided an excellent opportunity for European builders to sell in the American market.

Price Was Better . . . Their cause was further aided by the attractive prices of their products. Although machine tools cannot be bought entirely on price, the fact that many of these machines sell from 40 to 75 pct of their American counterparts, including duty and freight, does add to their desirability.

On the other hand American exports of machine tools last year were the highest since the peak years of World War II. American companies shipped roughly $125 million worth of machine tools and parts outside the continental U. S. The large part of these shipments was made possible by the availability of ECA and MSA funds.

Have a Problem . . . While the $125 million figure is impressive it represents only about 10 pct of total U. S. output last year. Historically the foreign market accounts for 25 pct of the volume. Whether or not this pattern can be reestablished is one of the great problems facing American industry.

So far this year imports are running slightly behind the 1952 pace. Some sources estimate the current import rate in the neighborhood of $3 to $4 million per month.

U. S. Imports By Type

Type	Total 1950	Total 1951	Total 1952
Gear Cutters..	$42,871	$346,633	$482,996
Punches, Shears, Bar Cutters..	56,230	216,339	230,843
Tools, Jig Boring	528,252	987,486	1,891,057
Grinding Machines	587,544	7,017,736	35,761,691
Metalworking Machines & Parts (not elsewhere specified) ..	1,076,145	5,135,461	11,501,488
	$2,291,042	13,703,655	49,868,065

Rate Won't Hold . . . Predictions are that this rate will not hold through all of 1953 because a large number of last year's imports were standard machines directly competitive with U. S. counterparts.

With domestic builders' backlogs now reaching manageable proportions, customers at home will have less reason to look overseas for equipment. Added to this is a natural preference for American-built tools.

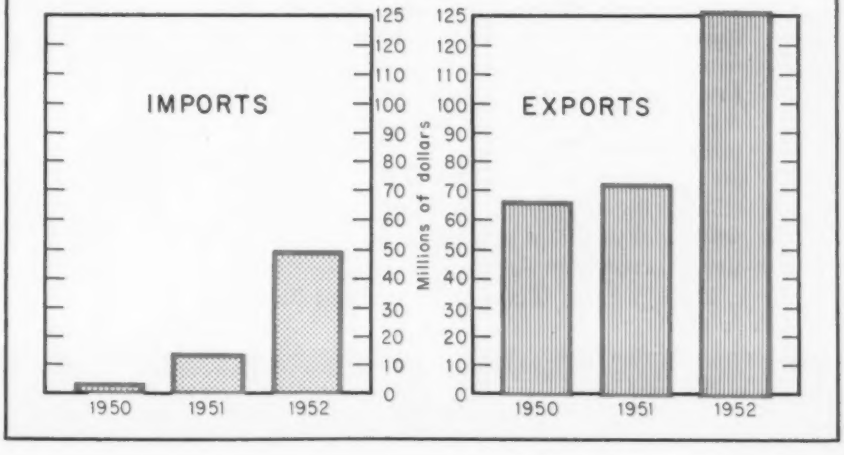
Dealers Disagree . . . Dealer sources, however, contend that imports of special foreign machine tools will remain at a brisk pace throughout 1953. They maintain that foreign makes which offer something extra or are more suited for specific operations will be able to hold their own here.

U. S. builders are less concerned about imports than they are about regaining their position overseas. Heavy as last year's imports were, they amounted to only about 5 pct of total U. S. output.

Dollar Causes Problem . . . Main obstacles to restoring our foreign trade to former levels are the shortage of American dollars abroad, our own government's restrictions on foreign business, and the limitation on imports of American machine tools imposed by foreign governments.

On the brighter side American industry can look forward to a market which has always held the American product in high esteem. These customers, particularly in Europe, will be subjected to a sales campaign.

Machine Tools We Bought and Sold



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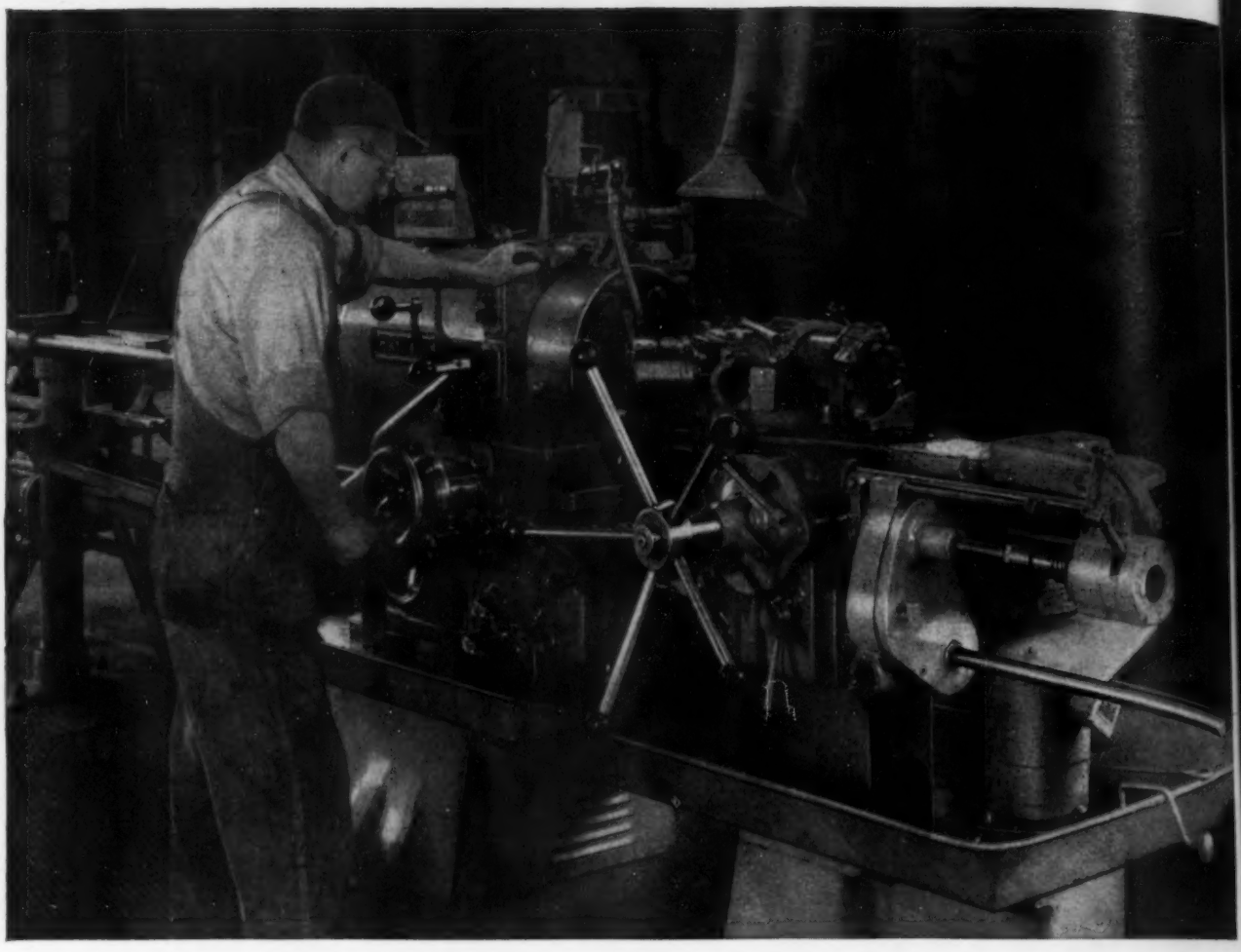

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This Gisholt Ram Type Lathe was first used to turn the plain ends on the one-inch quarter-octagon drill steel for two types of rock bits. Production averaged 30 an hour. Now, the machine is also used to machine and thread three sizes of forged steel drill rods. Besides all this, the Gisholt has the job of facing and chamfering the chuck, or shank ends, of the drill steel so that a perfectly flat face is hit by the drill machine tappet.

Here, again, Gisholt Ram Type Turret Lathes prove their easy change-over and ability to produce profitably, even on small runs—big assets in any machine shop. Ask your nearest Gisholt representative about them. Or write us.

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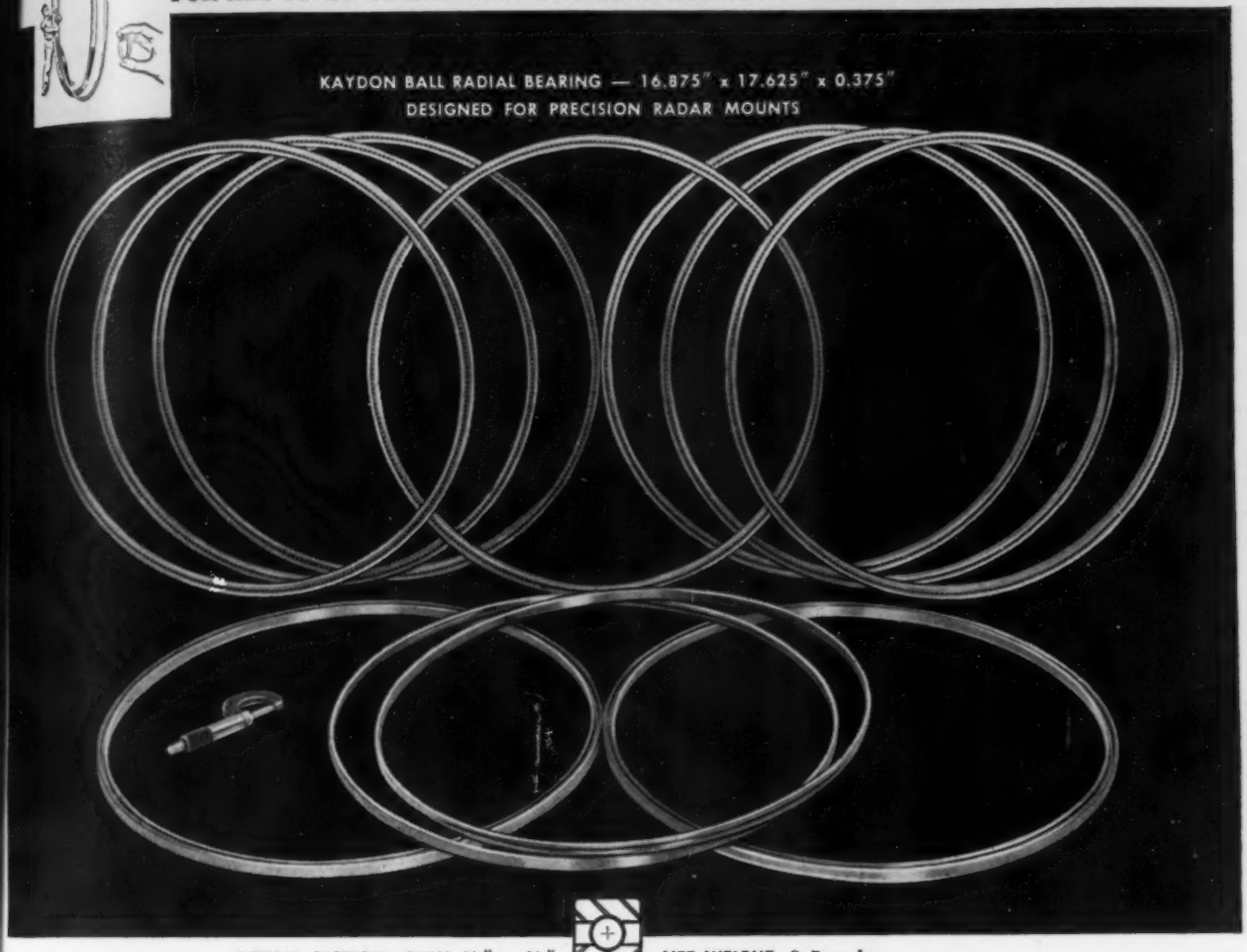

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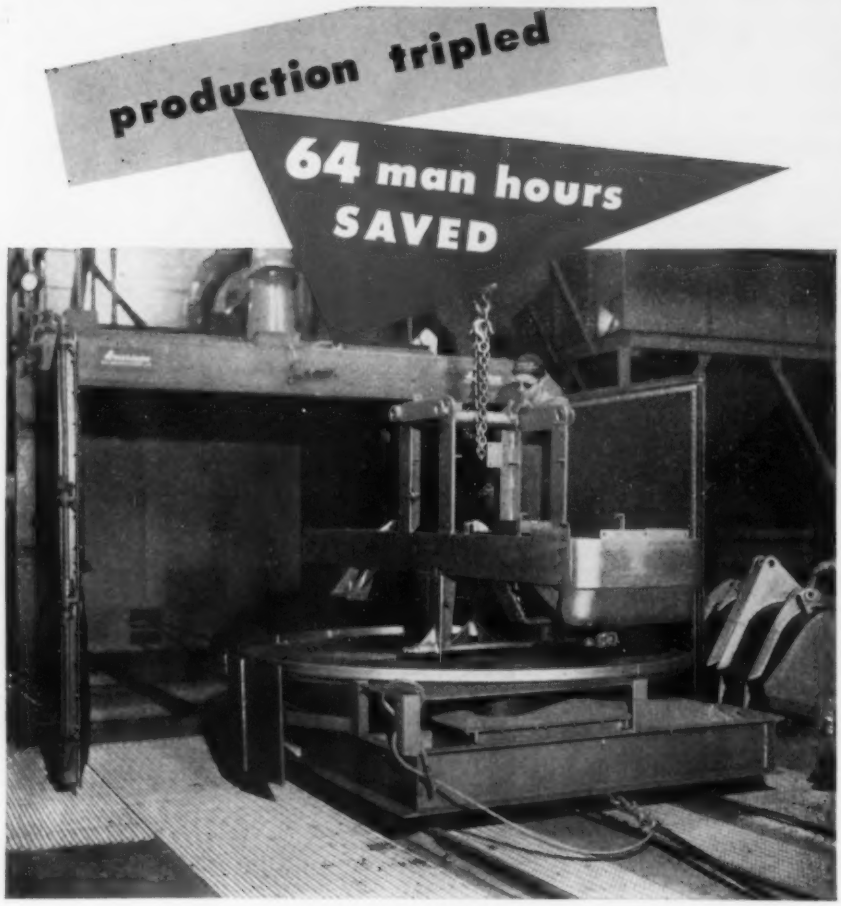

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Information on Gray double-housing planers is given in a new brochure. One feature of these units is the use of non-metallic ways. Laminated plastic plates are secured to the table by laminated plastic pins and are then planed to a smooth accurate bearing. *G. A. Gray Co.*

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Metal baling

The Dempster-Balester Type D, Model 600 S-1 is a high speed press said to turn out scrap metal bales at an approximate rate of 6 to 7.5 tons per hr. With its simple 2-ram design, the 600 is simple to install, easy to maintain, and economical to operate. The unit produces bales that are approximately 16 x 18 x 35 in. More information is in a new bulletin. *Dempster Bros.*

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Scale drawings

Scale drawings of Syncrogear motors are available to layout draftsmen, designers, engineers and architects. Drawn in a simplified style, but to exact scale, the drawings are designed to be inserted under a layout of a machine and traced in position. *U. S. Electrical Motors, Inc.*

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Coal handling

Wilmot Engineering Co's line of rivetless chains, conveyors, elevators and other materials handling devices for the coal industry is presented in a new 247 p. catalog. Specifications and drawings are included. *Wilmot Engineering Co.*

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Ventilation

National Assn. of Fan Manufacturers has just issued a bulletin on the problems resulting from the relationship of exhaust and make-up air systems and the bearing it has on the heating load. *National Assn. of Fan Manufacturers, Inc.*

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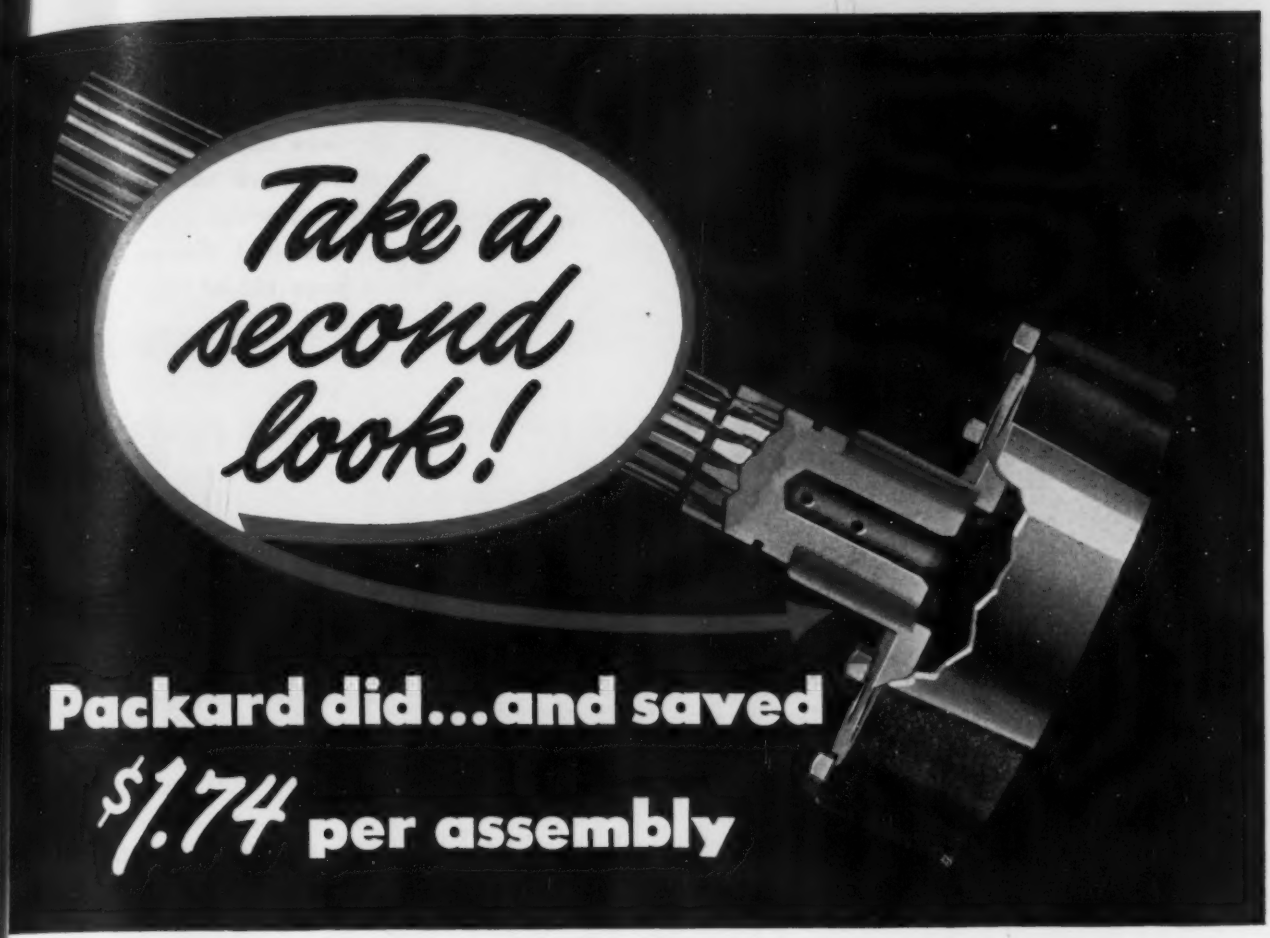

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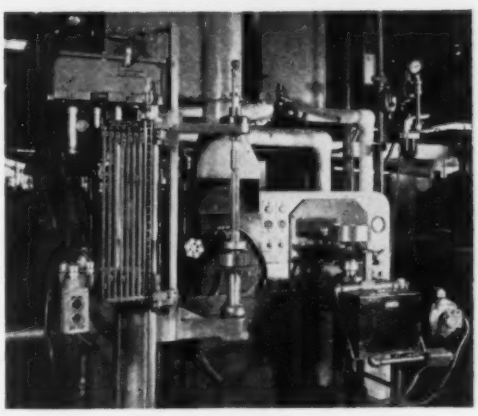
When designing *your* new product, or redesigning present products for more economical manufacture, you will profit by considering TOCCO Induction Heating for brazing, hardening, soldering, forging or shrink-fitting. Designing for Induction Heating pays off!



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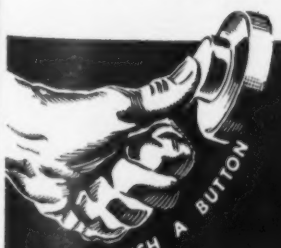

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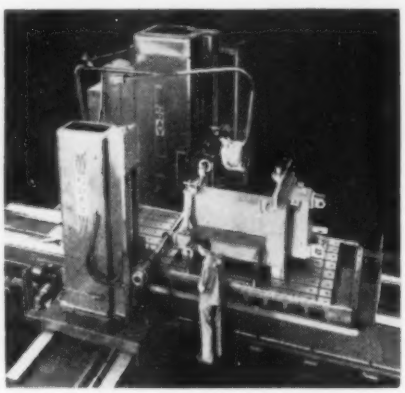

Huge boring machine used to make master gages

Boeing Airplane uses this huge Gray 6-in. planer type horizontal boring machine as a tool room unit to make master gages for B-47 stratojet bombers. The master gages, in turn, are used as the basis for the production gages that are used in daily assembly and machining operations. The boring machine features a 6-in. diam nitralloy spindle. Table will accommodate a workpiece 12 ft long x 6 ft wide x 6 ft high. Precision indexing to limits less than 0.00025 in. is permissible through the Gray electric Woodpecker power precision locating feature. Extreme accuracy of ways and guide surfaces is protected by a new non-metallic way, that eliminates metal-to-metal contact and virtually insures against scoring. *G. A. Gray Co.*

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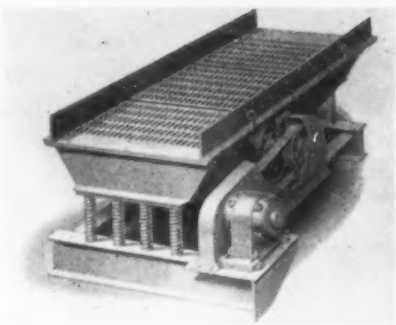

Foundry shakeout has 5000-lb maximum capacity

For foundries producing smaller size castings a medium duty foundry shakeout is available in four sizes, with capacities up to 5000 lb. These shakeouts provide fast separation of castings from flasks and molds, hasten reduction of sand lumps, tend to eliminate flask damage and simplify reclamation of reinforcing rods, gaggers and sprues. Provision is made for effectively limiting motion during acceleration and deceleration, thus eliminating the hazard of destructive vibration during the critical speeds. Vibrating mechanism is full-floating and enclosed. *Link-Belt Co.*

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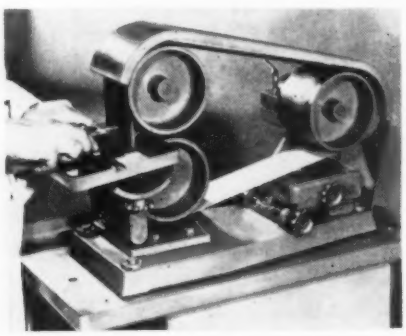


Carbide tool sharpening simplified, costs reduced

A method for final finishing carbide tools uses low-cost abrasive paper belts and belt machine. A two-step tool sharpening technique is used: rough grinding on a standard grit 60 silicon carbide wheel, and finishing the sides and top of the carbide tip on the belt machine. A Tri-M-Ite resinite abrasive belt ranging from grit 60 to 150 is used depending on the edge required. A 1/16-in.-wide land is finished from the cutting edge down. This land is at the desired clearance angle and is flat, not hollow ground. Calibrated tilting table swings out for quick belt replacement without disturbing angular setting. *Minnesota Mining & Mfg. Co.*

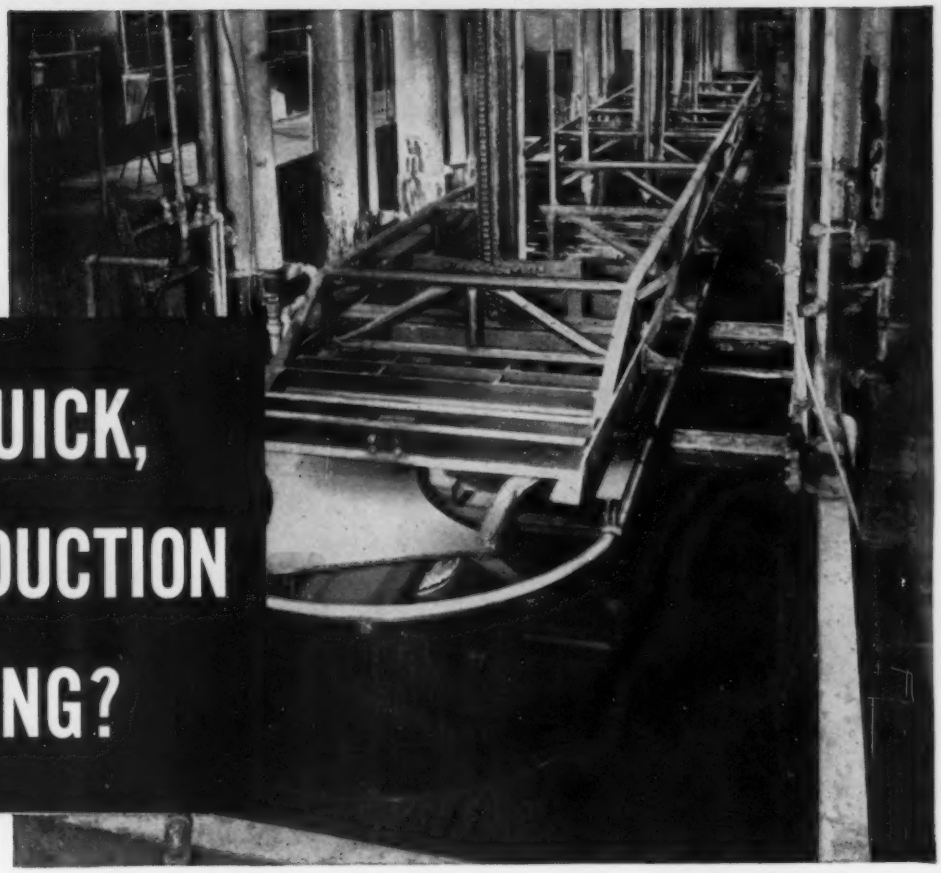
For more data circle No. 21 on postcard, p. 103.

Locating microscope aids the machinist

A machine tool locating microscope when attached to a machine tool such as a jig borer or a vertical milling machine, aids the machinist in checking contours, slots and surface conditions which cannot be checked by mechanical measuring instruments. The microscope provides 30X magnification, great enough to see 0.0001 in. Field of view includes a full ¼ in. of the workpiece. All table movements appear in their true direction when viewed through the eyepiece. The microscope components are assembled in a cast aluminum housing, which is light in weight, rugged and compact. *Perkin-Elmer Corp.*

For more data circle No. 22 on postcard, p. 103.

Turn Page



NEED QUICK, HIGH PRODUCTION CLEANING?

METAL MOULDINGS CORPORATION OF DETROIT DOES IT AUTOMATICALLY

with UDYLITE EQUIPMENT!

"We had to have a FAST . . . yet SURE . . . method of cleaning our automotive stampings before plating. And these stampings are *really* intricate shapes. That's why we chose AUTOMATIC cleaning using a Udylite Full Automatic."

Yes, that's what the people of Metal Mouldings Corporation, Detroit, Michigan, told Udylite. They must combine a large volume of cleaning with no rejects. They found that Udylite equipment assured them of high production...while it saved time and manpower.

If you have cleaning problems . . . let the Udylite Corporation provide the answer. Your Udylite Technical Man will show you a faster, more economical, AUTOMATIC way to clean metal parts. Call him today or write direct for all the facts.

THE UDYLITE CORPORATION, DETROIT 11, MICHIGAN. *West of Rockies, L. H. Butcher Co., Los Angeles 23, California.*

PIONEER OF A BETTER WAY IN PLATING

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

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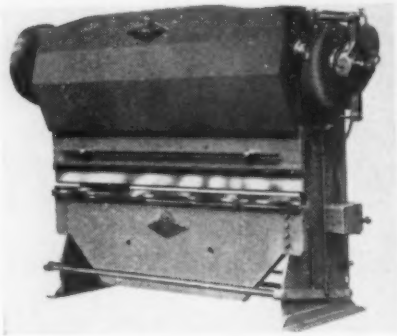
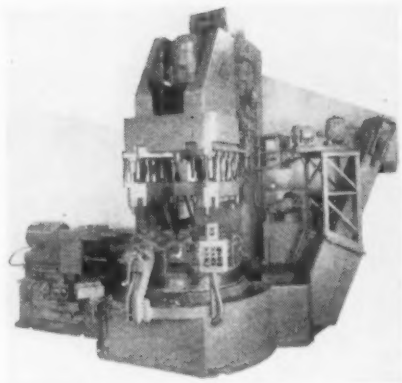


Production press brake has ram adjustment

Of 36 tons capacity and 96 in. bed length, the Besco production press brake, Mark II, differs from previous brakes in the range, by incorporating a 2-in. adjustment of the ram for tool setting, as opposed to a bed adjustment. This improvement gives considerable advantages in rigidity permitting the maximum variation in tool usage. Drive is rear-mounted 4 hp 1440 rpm electric motor with pushbutton starter. Capable of forming sections in sheet metal and plate using single and multiple dies, the Mark II has a standard pair of forming dies for 90° bends, with a V die opening for full length in 14 s.w.g. mild steel plate. *F. J. Edwards, Ltd.*

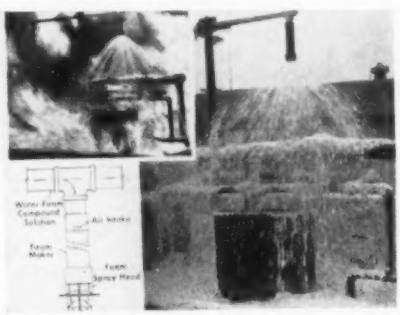
For more data circle No. 23 on postcard, p. 103.



Tractor track links machined at 45 pieces per hour

This 2-way drilling and counterboring machine with 4-station automatic indexing table is used by an agricultural implement manufacturer in machining tractor track links. At left is mounted a No. 7½ HS hydraulic slide type unit with 4-spindle drilling head and at rear is a vertical column on which is mounted No. 30VS slide type hydraulic feed unit carrying 10-spindle drill head. A special chip unloading conveyor is at the right. In each of the four fixtures on the indexing table is loaded one RH part and one LH part. Production is approximately 45 pieces per hr at 100 pct efficiency. *LeMaire Tool & Mfg. Co.*

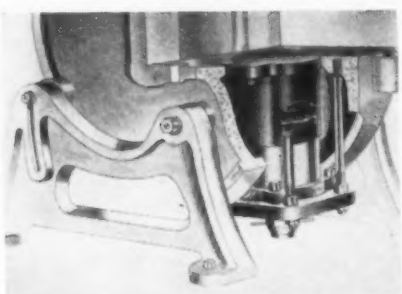
For more data circle No. 24 on postcard, p. 103.



Unit discharges foam spray for chemical fires

For overhead protection of medium-sized oil and chemical hazards a spray-type foam maker blankets flames with air foam over a wide area all at one time. The foam maker, generating the fire-fighting foam right at the hazard, is equipped with a cone-shaped spray head which discharges an even pattern. The device is for use in fixed systems, singly or in multiples, indoors or out. Coverage ranges from 10 to 20 ft diam, depending on the operating pressure, from 30 to 100 psi. Foam makers of two capacities are manufactured. *Pyrene Mfg. Co.*

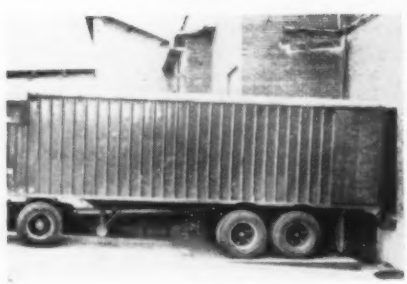
For more data circle No. 25 on postcard, p. 103.



Pneumatic die cushions for inclinable presses

The Model DB full universal pneumatic die cushion is completely self-contained, and can be used with or without surge tank. Internal guiding means compensate for off-center loading of the pin pressure pad. A combination reducing regulating valve and pressure gage assures constant work pressure on the pin pressure pad at all times. Die cushions are made in eight sizes from 5 to 18 in., producing ring holding pressures of 1 to 14 tons on 100 lb airline pressure. *Dayton Rogers Mfg. Co.*

For more data circle No. 26 on postcard, p. 103.

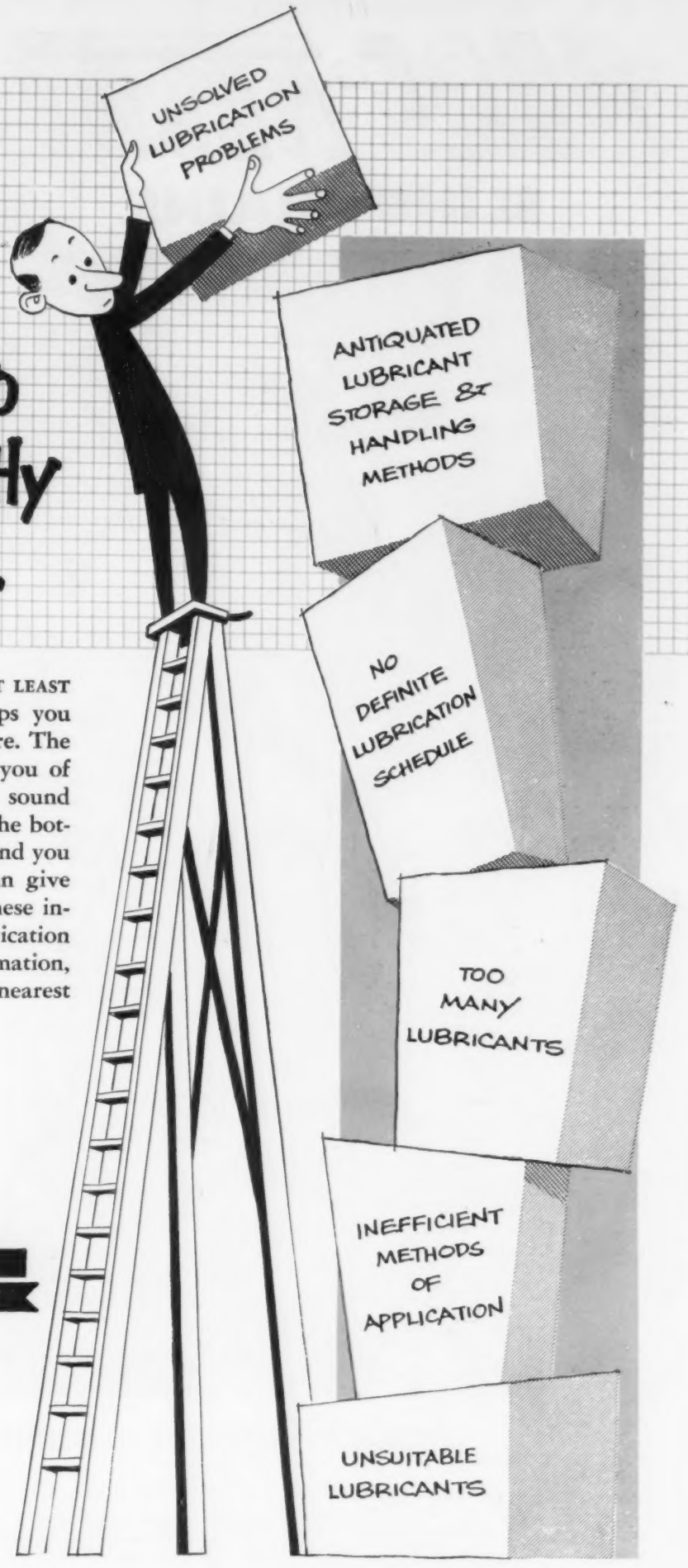


Raises or lowers highway trucks to dock height

The Adjust-A-Truck which raises or lowers over-the-road carriers to dock height is suitable for firms who do not have adequate room on or in front of their docks to install adjustable dock ramps. The unit is set into the pavement in front of the dock and by means of a heavy-duty electric hydraulic system adjusts each vehicle to dock height. Its capacity is 40,000 lb. Raising and lowering of the Adjust-A-Truck is instantaneous. Deck is 10 x 12 ft long. *Rowe Methods, Inc.*

For more data circle No. 27 on postcard, p. 103.
Turn Page

Building up to a costly letdown...



OF COURSE YOU'RE NOT—OR AT LEAST NOT CONSCIOUSLY. But perhaps you are missing a bet here and there. The sketch is intended to remind you of the importance of building a sound lubrication structure — from the bottom up. We'd also like to remind you that a Gulf Sales Engineer can give you practical help on any of these individual phases of the lubrication problem. For additional information, write, wire, or phone your nearest Gulf office.

GULF OIL CORPORATION
GULF REFINING COMPANY
Pittsburgh 30, Pennsylvania

GULF SERVES INDUSTRY

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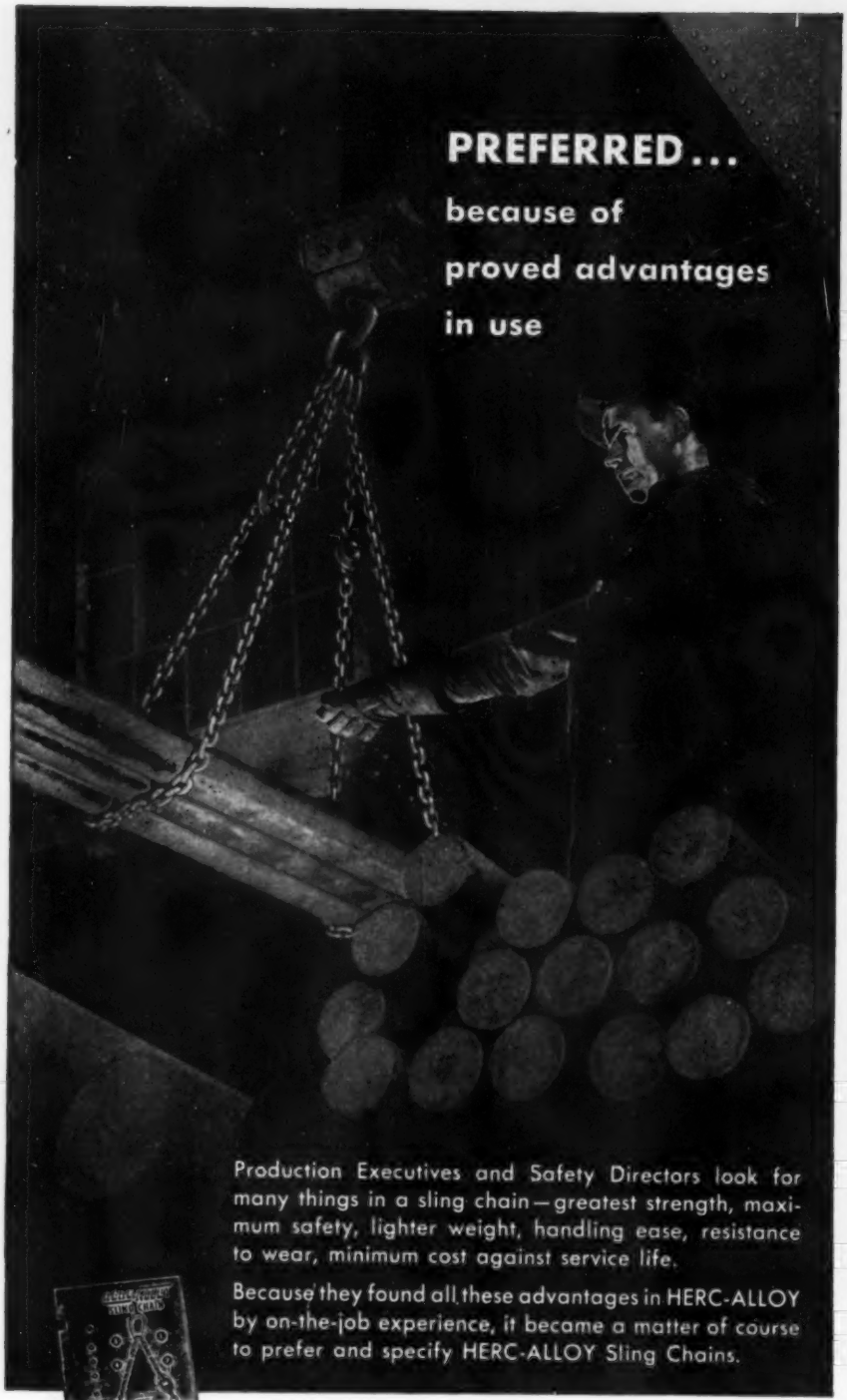
HERC-ALLOY
SLING CHAINS



Production Executives and Safety Directors look for many things in a sling chain—greatest strength, maximum safety, lighter weight, handling ease, resistance to wear, minimum cost against service life.

Because they found all these advantages in HERC-ALLOY by on-the-job experience, it became a matter of course to prefer and specify HERC-ALLOY Sling Chains.

Write for illustrated Data Book No. 3 which contains helpful information on sling chain selection and use.

COLUMBUS McKINNON CHAIN CORPORATION
(Affiliated with Chisholm-Moore Hoist Corp.)
GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.
***District Offices:* New York • Chicago • Cleveland**
Other Factories at Angola, N. Y., Dixon, Ill., St. Catharines, Ont., Can., and Johannesburg, South Africa.

Hardness tester

The Porta-Brinell makes a positive hardness test employing a penetrator that makes an impression at a controlled hydraulic force of 500 kg. The impression is read with a standard Brinell microscope and translated to Brinell hardness. Range of tester is 20 to 500 Brinell with maximum accuracy over the full capacity of the machine which is 12 in. gap and a 4½ in. thrust. Tester works in any position. *Blosjo Enterprises.*

For more data circle No. 28 on postcard, p. 103.

Pumping unit

A small, low-cost automatic pumping unit provides trouble-free dependable lubrication for single machines. The DC-20 is intended for use with Farval Dualine valves and will give completely automatic centralized lubrication, with these advantages: Accurately metered amounts of lubricant, without waste or spillage; positive frequency control; automatic independent time clock control; increased safety. *Farval Corp.*

For more data circle No. 29 on postcard, p. 103.

T nuts

T nuts are mass-produced in 15 sizes to fit machine tool applications and eliminate costly, custom toolroom machining. Throat sizes range from 7/16 to 1⅛ in. All sizes are accurately machined of heat treated alloy steel with 200,000 psi tensile strength. *Jergens Tool Specialty Co.*

For more data circle No. 30 on postcard, p. 103.

Turn Page

Which Twin is the *Phony?*

It Might be Worth a Fortune to Know —IN ADVANCE!

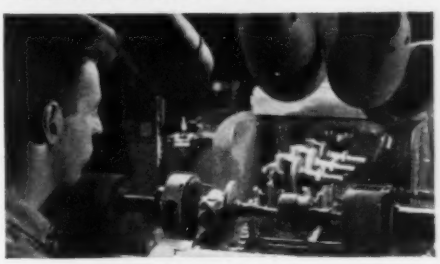
One of these "twins" (could be any kind of part or material) is perfectly good—the other worthless. Why? Because one has a tiny crack that went unseen until *final* inspection, and had to be scrapped. Could this happen in your plant?

If *you* knew *in advance* that certain parts or materials were defective, would you waste processing time, labor and money on them?

NOW YOU CAN KNOW, thanks to the fast, positive inspection methods developed by Magnaflux Corporation for cost-cutting process control. WRITE US—we'll show you how.

Magnaflux is a U.S. Registered Trademark of Magnaflux Corporation

PROCESS CONTROL
—through Methods by Magnaflux—
FINDS THE "HOW AND WHERE" OF LOWER PRODUCTION COSTS



- **Detects defective parts or materials at a point where it costs least to reject them.**
- **Reveals operating troubles in tools or processes at first occurence so they con be corrected.**
- **Insures quality that is acceptable at lowest cost per piece.**

Write for this broad coverage booklet now ➡

MAGNAFLUX* DETECTS DEFECTS

MAGNAFLUX CORPORATION
730 W. Lawrence Avenue, Chicago 31, Illinois
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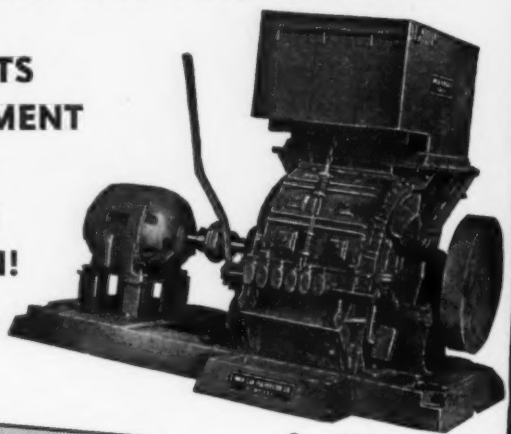
More "CRUSHING" FACTS ON American CRUSHER PERFORMANCE

American METAL TURNINGS Crusher

AVERAGES 1000 TONS MONTHLY

. . . PARTS REPLACEMENT COST— $0.03 PER TON!



Case History No. 14

PERFORMANCE DATA

PROBLEM: To reduce machine turnings to shoveling chips.
INSTALLATION: American Metal Turnings Crusher #3800.
AGE: 6 years in operation.
TONNAGE: Average 1000 Tons Per Month
TOTAL PARTS TO DATE: $2,028.30.
PARTS COST PER TON: $0.03

This performance record of a well-known Detroit manufacturer is familiar to other American Crusher owners, who have long since learned that there are 3 significant profit sources in every American installation: (1) American-reduced chips bring $4 more per ton in the scrap market, (2) Chips release up to 50 gallons per ton in recovered cutting oil, (3) Chips require less storage space . . . are easier to handle.

WRITE for Metal Turnings Crusher Bulletin

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1439 MACKLIND AVENUE • ST. LOUIS 10, MISSOURI

Demagnetizer

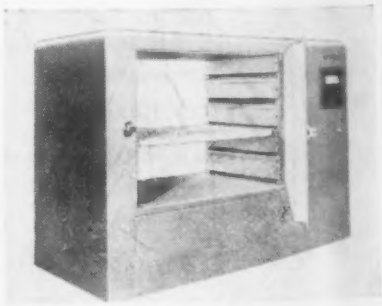
An aid to better production through removal of loose metal filings is provided by a new powerful demagnetizer that can be used for large and small work. To demagnetize small items, such as cutting tools, the item is drawn slowly back and forth across the poles of the Model

D-3 and then slowly drawn away. For larger parts, or where it is not convenient to move the part, the demagnetizer can be turned up side down and passed over the part until its entire surface has been exposed. Switch and pilot light are at one end next to handle. *Martindale Electric Co.*

For more data circle No. 31 on postcard, p. 103.

Recirculating oven

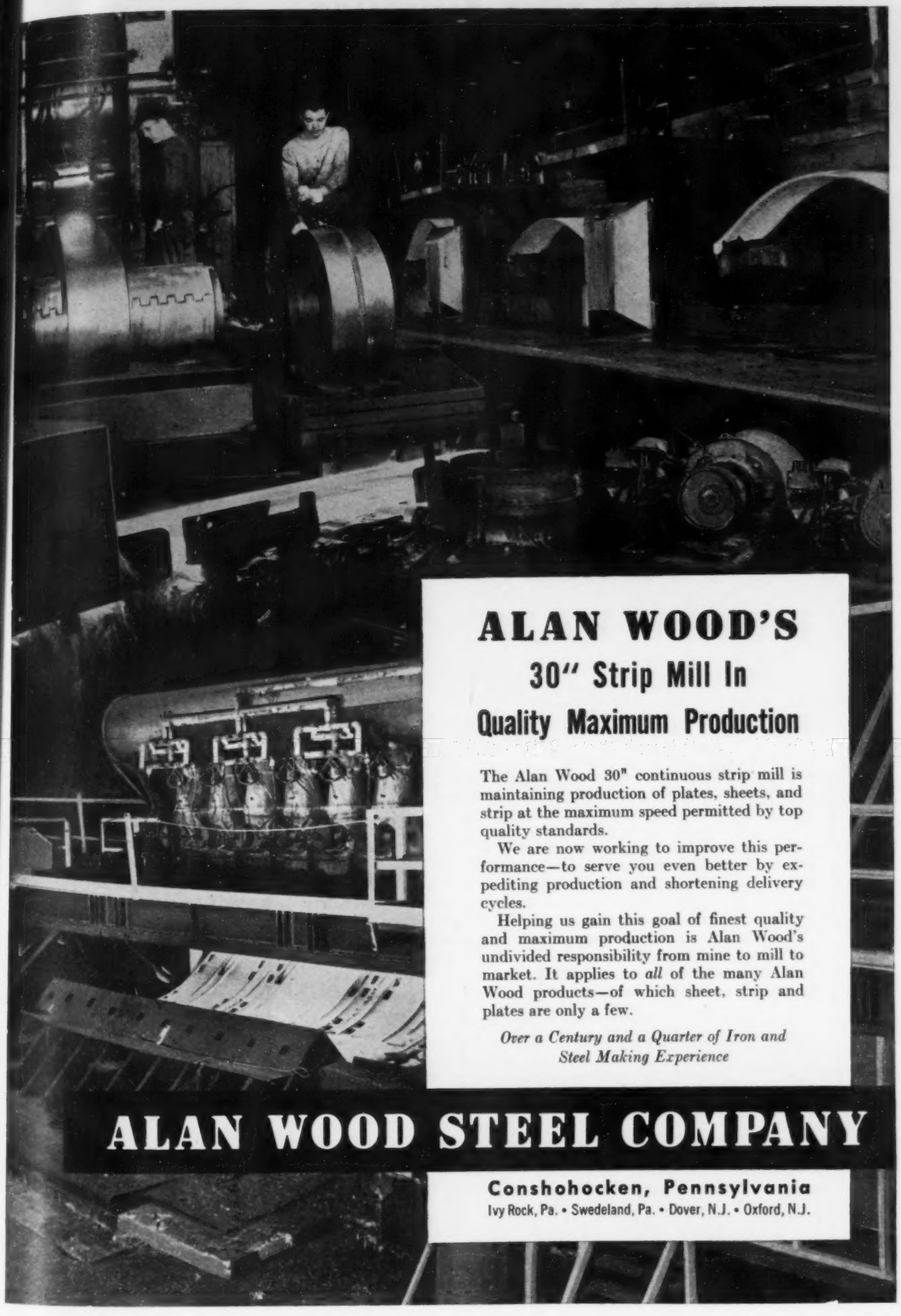
For special work or production runs on the smaller class of products, a new self-contained, electric recirculating oven has a work area of 30 in. wide x 24 in. deep x 24 in. high. Prime heat source is a bank of thin stripped heaters located in the housing around the insulated chamber. Uniform distribution of



heat throughout the chamber is accomplished by a built-in four bladed fan. Heat is regulated by adjustable louvers at both ends. The oven operates at 0 to 550°F. *Pereny Equipment Co.*

For more data circle No. 32 on postcard, p. 103.

Turn Page



ALAN WOOD'S

30" Strip Mill In

Quality Maximum Production

The Alan Wood 30" continuous strip mill is maintaining production of plates, sheets, and strip at the maximum speed permitted by top quality standards.

We are now working to improve this performance—to serve you even better by expediting production and shortening delivery cycles.

Helping us gain this goal of finest quality and maximum production is Alan Wood's undivided responsibility from mine to mill to market. It applies to *all* of the many Alan Wood products—of which sheet, strip and plates are only a few.

Over a Century and a Quarter of Iron and Steel Making Experience

ALAN WOOD STEEL COMPANY

Conshohocken, Pennsylvania

Ivy Rock, Pa. • Swedeland, Pa. • Dover, N.J. • Oxford, N.J.

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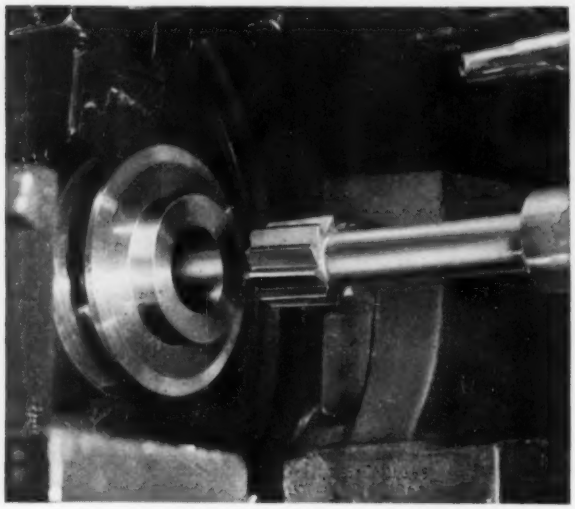
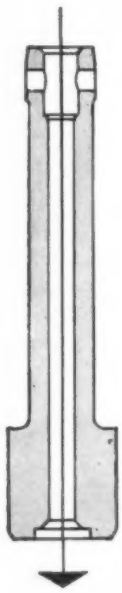
REAM FINE FINISHES

ON SCREW MACHINES AND TURRET LATHES



20-25 Micro-inch Finish

Reamed finishes never considered possible are now obtained on regular production runs with Barber-Colman Oil-Feed Reamers. On this job, 1000 pieces were reamed to a surface finish of 20-25 micro-inches before it was necessary to sharpen the reamer. Feed used is 1.75" per minute at 280 rpm., requiring 30 seconds to ream the 7/8" length of cut in AISI C1137 steel.



Oil-feed

An outstanding feature of these reamers is that oil feeds through the body of the tool to flush away chips from the cutting area. Other types of reamers tend to pack chips in front of the reamer, increasing the chance for "pick up" which often ruins finish and shortens tool life. As oil hits the end of the hole, it is forced back between the flutes carrying chips with it. Another aid to extending tool life is that oil reaches the cutting area on jobs which could not otherwise effectively employ a free flow of coolant.

Irregular flute spacing, cam-controlled sharpening, sharp cutting edges—these are exclusive features on all Barber-Colman Reamers to give you smooth cutting, fine finishes, precision hole accuracy and high rates of production. Consult Barber-Colman engineers on your Hole Finishing Problems.

Write For New Price and Specification Bulletin

BARBER COLMAN

Barber-Colman Company

GENERAL OFFICES AND PLANT, 9115 ROCK STREET, ROCKFORD, ILLINOIS

—New Equipment—

Continued

Weight recorder

A mechanical weight recorder is built in as an integral part of the Howe-tape-drive dial head. The Mechanoprint is fast, ruggedly designed and has a minimum of working parts to assure trouble-free op-

eration and long life. Simple touch of the push bar causes the weight to be printed; time is 1 sec. Printing can also be controlled by a trip switch on a conveyer line, or a monorail system and by other methods. *Howe Scale Co.*

For more data circle No. 33 on postcard, p. 103.

Metal slitting shear

Weighing 118 lb, a portable metal slitting shear is said to cut consistently to a tolerance of 0.005 in. at speed of 73.3 fpm on 20 gage or lighter mild steel, copper, aluminum and Monel metal. It incorporates features of heavy duty Wilder metal slitters, including two power-driven hollow-ground edge, high carbon, high chrome tool steel blades. The Junior shears widths from 1¼ to 24¼ in. to any length. *Wilder Mfg. Co.*

For more data circle No. 34 on postcard, p. 103.

Turn Page

PLUG A HOLE AND KEEP IT PLUGGED WITH PERMANENTE 84!

You can *keep* holes plugged, *slash* down-time for hot repairs, *boost* steel furnace production with Permanente 84 ramming and patching mix. Here's why:

Permanente 84 shrinks less than 1%—even at temperatures as high as 3000° F—because the periclase grains are pre-shrunk to maximum density and the patented bond does not form appreciable liquids below 3000° F.

This unsurpassed volume stability of Permanente 84 means fewer repairs are needed between heats. And faster repairs are possible because it's easy to use.

Act now! Start using Permanente 84 for open hearth and electric steel furnace rebuilds as well as for bottom, bank and tap hole maintenance. Let Permanente 84 help increase *your* production—and reduce your material costs through superior performance.

SEND FOR BOOKLET giving all the important advantages of Permanente 84 and the companion material, Permanente 165. Upon request, your Kaiser refractory engineer will promptly offer you research, design and installation service to help you obtain more steel tonnage per year, at lower bottom cost per ton. Call or write principal sales offices: *Chemical Division*, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California. First National Tower, Akron 8, Ohio.

Kaiser Chemicals

Pioneers in Modern Basic Refractories

Basic Refractory Brick and Ramming Materials • Dolomite • Magnesia • Magnesite • Alumina • Periclase

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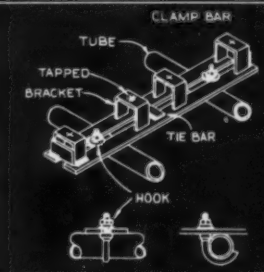
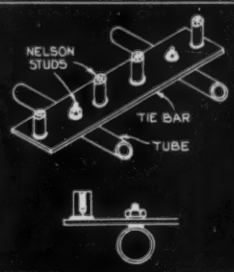
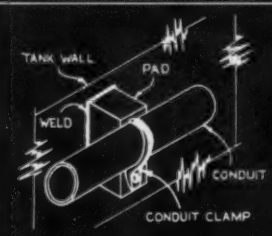
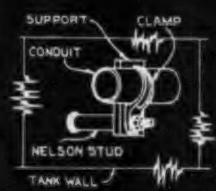
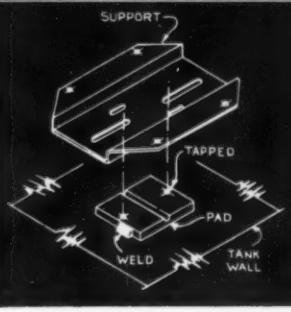
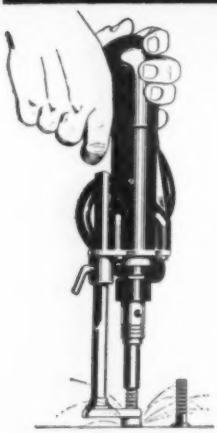
71% to 86% Savings by redesigning with NELWELD*

FORMER METHOD	NELWELD METHOD	RESULT
		75% SAVING with NELWELD
		86% SAVING with NELWELD
		71% SAVING with NELWELD



These substantial savings in fabrication costs were obtained when an electrical equipment manufacturer took advantage of the NELWELD method of fastening to redesign component parts. If you are now drilling/tapping or hand welding, chances are you too can . . .

Cut fastening costs, gain important corollary benefits—with NELWELD

In addition to slashing direct fastening costs, NELWELD pays off with such important corollary advantages as: reduction in costly material handling . . . saving in steel by eliminating bosses, flanges, brackets . . . a saving in manhours required to assemble . . . increased production.

If you're ready to cut your costs, start by writing for the booklet, "How to Design for NELWELD."

*Trademark

Fasten it Better . . . at Less Cost, with NELWELD T.M. REG.

NELSON STUD WELDING

DIVISION OF GREGORY INDUSTRIES, INC., LORAIN, OHIO

—New Equipment—

Continued

Pickling aid

Black-Magic Pik-Aide is a chemical solution which is added to hydrochloric sulfuric and nitric acid pickling solutions to produce a brighter, uniform, faster and more economical pickling action with a minimum of attack on base metal. It reduces acid consumption because of faster and more complete draining of the solution; makes rinsing more thorough and complete. Pik-Aide is non-toxic and non-inflammable. Proportion used is 2½ qt Pik-Aide to 100 gal pickling solution. *Mitchell - Bradford Chemical Co.*

For more data circle No. 35 on postcard, p. 103.

Hydraulic pumping unit

A compact hydraulic pumping unit for low gpm operation has an all steel welded reservoir with oil level sight gage, drain cock and access panel. Design includes a high strength aluminum alloy pump with

nitraloy gears for long life. The unit is completely piped with relief valve, check valve, reservoir filter and air breather filter. Pressures up to 12 psi; capacities 0.8 to 2.8 gpm. This package unit is available with or without motor. *Hackett Brothers, Inc.*

For more data circle No. 36 on postcard, p. 103.

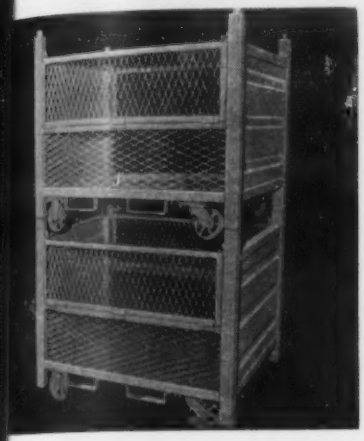
Flame-proofed gloves

Flame-proofed gloves are manufactured from a heavy bright red cloth, which permits positive identification of the gloves. Mitts and gloves, lined or unlined, are for temperatures ranging up to 800°F. *C. Walker Jones Co.*

For more data circle No. 37 on postcard, p. 103.

tock carrier

esigned to eliminate congestion in any plant areas is this 1-ton capacity tubular heavy duty stock carrier. Wire mesh sides provide complete visibility. Carriers can be moved as single units or as a trackless train. They can be stacked six high with a standard fork truck.

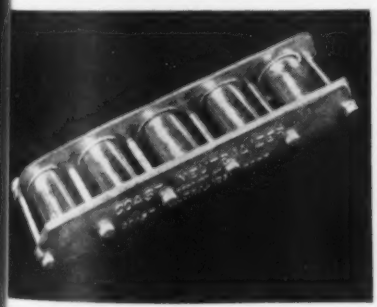


Corner posts are made of seamless tubing; corrugated ends and base provide double strength where shock and wear are heaviest. For easy access to contents, sides drop down on heavy duty hinges. Two swivel and two rigid 6-in. roller bearing steel casters provide mobility. *Rack Engineering Co.*

For more data circle No. 38 on postcard, p. 103.

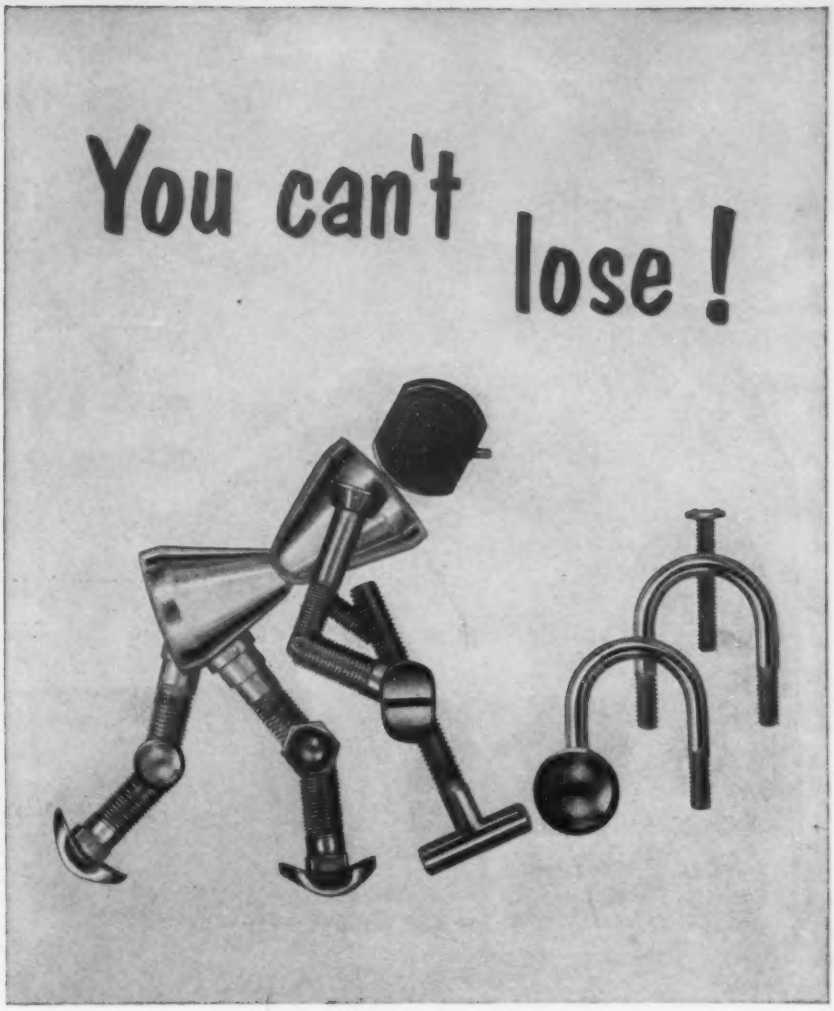
Neutralizer

Scale, rust, and corrosion are removed from boilers, condensers, evaporators, refrigerators, and hot water systems using an improved neutralizer. This is done entirely



by the use of electrolysis setting up a greater voltage than is in the vessel, and reversing the polarity back to the neutralizer. This automatically controls the PH and kills the gasses that cause rust and corrosion. *Coast Neutralizer Corp.*

For more data circle No. 39 on postcard, p. 103.



Whether your fastener requirements call for special bolts . . . or standard . . . you can get experienced cooperation and service from Buffalo Bolt.

In using Circle B specials . . . you can often simplify product design . . . gain extra holding strength . . . speed assembly . . . and cut your unit costs.

In specifying Circle B standard bolts . . . you get quality built in by modern methods and machines designed to meet your volume demands.

In both cases, you can depend upon the experienced counsel of a concern which is satisfactorily supplying leading industrials known for their purchasing and production efficiency.

Let us discuss and demonstrate to you the many practical advantages of dealing with Buffalo Bolt. Your inquiry will receive our prompt attention.

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PRODUCERS OF CIRCLE B PRODUCTS — BOLTS • NUTS • RIVETS AND SPECIAL FASTENERS

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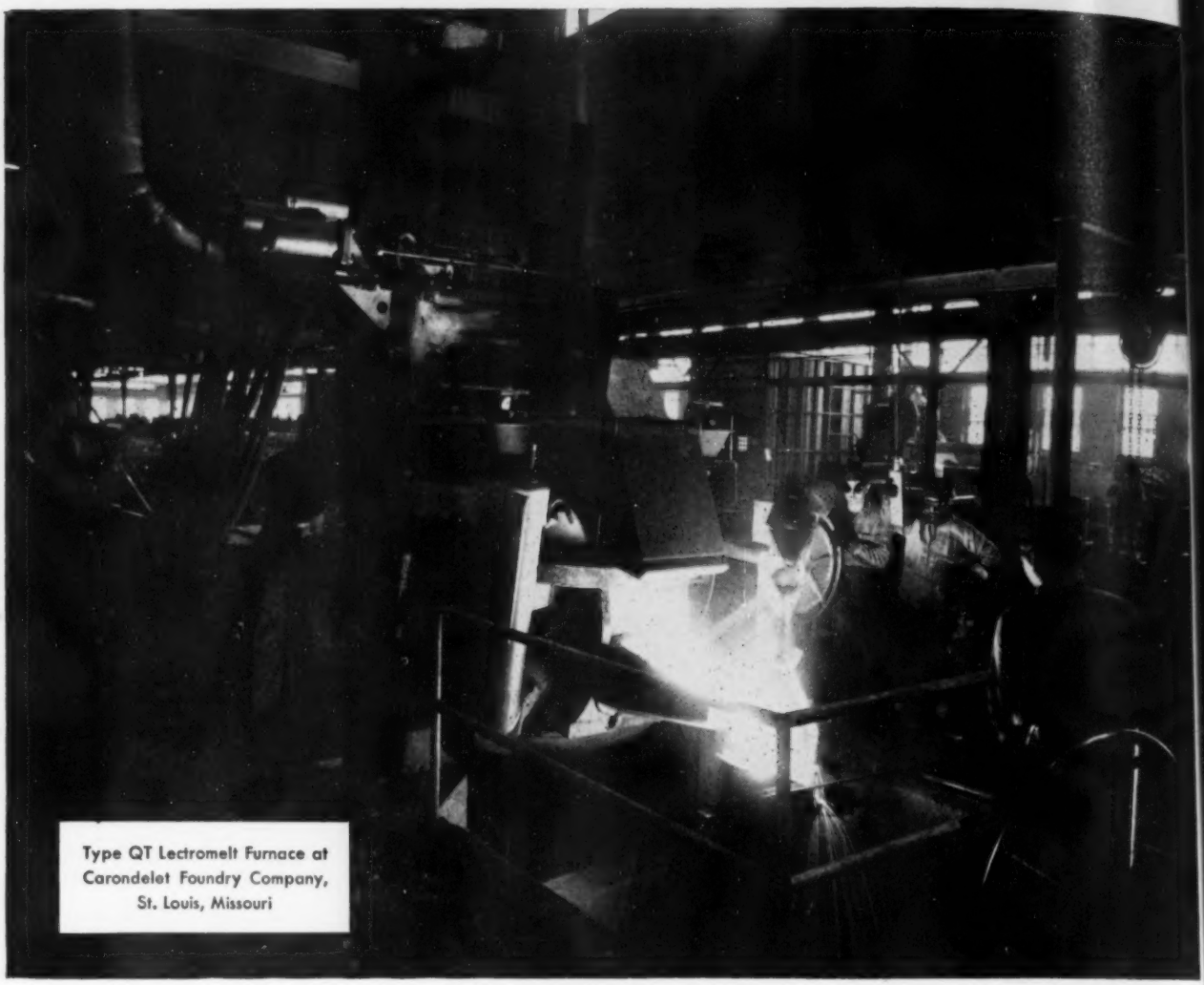


Type QT Lectromelt Furnace at Carondelet Foundry Company, St. Louis, Missouri

"Our *Lectromelt** Furnace gives us the Versatility needed in our jobbing foundry"

"Top-charging doesn't give our Lectromelt Furnace much time to loaf, boosting its productive time and holding down labor costs," reports Carondelet Foundry Company.

"Its versatility lets us shift easily from one type product to another . . . from high strength gray irons for pressure castings, to special steels for heat resistance, corrosion and abrasion resistance. In 10 minutes we make a spectrographic, prepouring analysis, permitting us to adjust each heat to meet specifications.

"Our Lectromelt Furnace is new, but already it's proved its worth."

If your business involves melting, smelting, refining or reduction, it will pay you to investigate what Lectromelt Furnace Equipment will do for you. For Catalog No. 8, write: Pittsburgh Lectromelt Furnace Corporation, 312 32nd Street, Pittsburgh 30, Pa.

Manufactured in . . . CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2 . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co., Ltd., Nagoya

MOORE RAPID

WHEN YOU MELT... *Lectromelt*

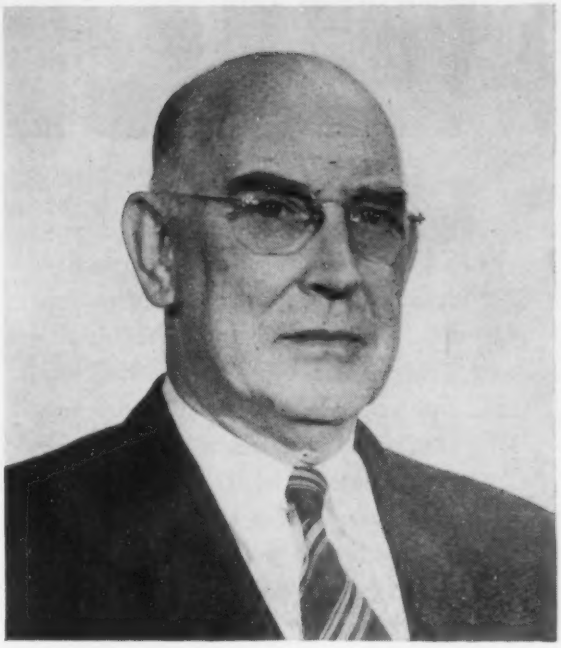
*REG. T. M. U. S. PAT. OFF.

The Iron Age

SALUTES

Vernon H. Dearle

If you look at his feet you may think he's old-fashioned, but he helped speed the automated era.



VERN DEARLE wears high-button shoes—an anachronism that would seem to put him out of step in an era of automated auto production. Yet Vern is one of the men partly responsible for Detroit's push-button car-making techniques.

Michigan sales manager of General Electric's Carboloy Div., he is one of those rare individuals credited with an important "first." In 1928, his first year as Carboloy's first salesman, he sold the auto industry its first carbide cutting tool—a tool used to turn a cast iron fly wheel. The order was placed by a man who also has an important first to his credit—the late Henry Ford.

Use of carbide tools eventually made possible the development of transfer machines, so important in automated production. Without these fast-cutting, durable tools it would be impossible to develop the speed needed to make transfer machines practicable and downtime would be prohibitive.

Vern's interest in carbide tools did not end with his first sale. In the pioneer days of carbide tools, a salesman had to double as an engineer, and it was in this role that Vern worked out many of the bugs that appeared when carbide tools were first introduced.

Born and educated in England, Vern began working in this country at the Ford Motor Co. in 1910. He has been with Carboloy for almost 25 years and his approaching retirement in June has many of the company's younger men seriously concerned because Vern has always been a friendly adviser.

Vern also takes a dim view of his retirement, and it seems probable that after a short rest he will place his high-button brogues under a consulting desk in his own company.

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with WICKWIRE

Wickwire specialty steel wires such as flexible shaft wire, spheroidized wire, dent spacer wire, aircraft cord wire, bobbin ring wire, broom and brush wire, weaving wire, rope wire and preformed staple wire have long been proud products of Wickwire.

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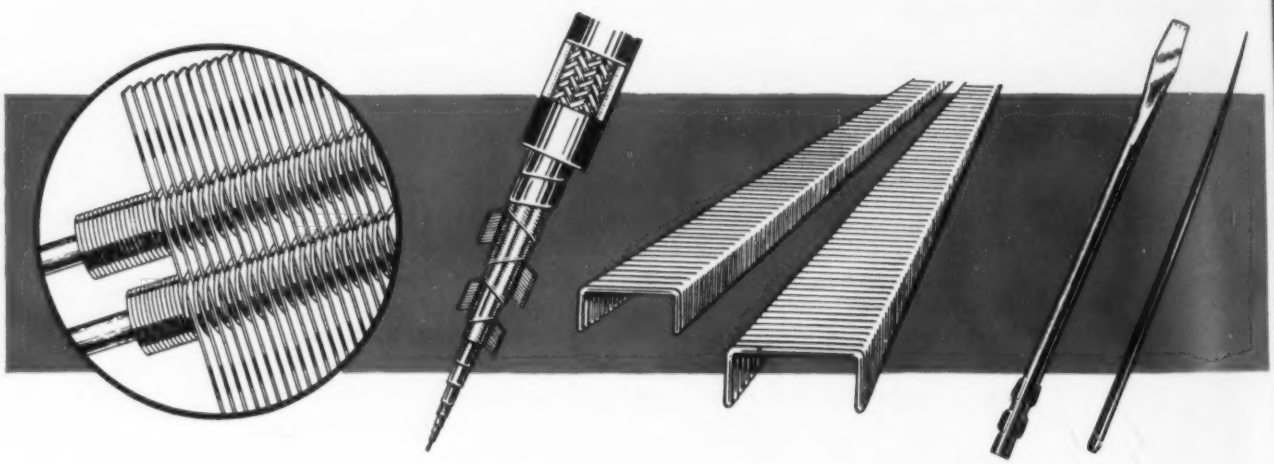
We can meet your most exacting specifications for specialty wire that best suits your particular requirements . . . in high or low carbon steel; round or shaped; and in a wide variety of tempers, grades and finishes. For The Wire You Require—Check First With Wickwire.



THE COLORADO FUEL AND IRON CORPORATION—Denver, Colorado
THE CALIFORNIA WIRE CLOTH CORPORATION—Oakland, California
WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo
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PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

CF&I

The Iron Age

INTRODUCES

Jack L. Wilson, assistant to the president, named director of sales, PENNSYLVANIA CHEMICAL CORP.

E. C. Quinn, elected president, Chrysler Div., CHRYSLER CORP., Detroit; **I. T. O'Brien,** appointed to the executive staff of the president; and **Fred J. Lamborn,** appointed special consultant to the president.

William H. Burkhart, elected executive vice-president, LEVER BROTHERS CO.; **John P. Moser,** elected production vice-president; and **Gary G. Grant,** becomes general manager, Manufacturing Div.

F. N. Floyd and **Arthur G. Middleton,** elected vice-presidents and directors, UNITED ENGINEERS & CONSTRUCTORS INC., Philadelphia.

George S. Sangdahl, elected a vice-president, CHICAGO BRIDGE & IRON CO.

T. A. Straub, Jr., elected vice-president, FORT PITT BRIDGE WORKS, Pittsburgh.

S. Floyd Stewart, appointed assistant to the president, JACK & HEINTZ, INC., Cleveland.

Kenneth H. Colville, Jr., elected secretary and a member of the board of directors, HENDRICK MFG. CO., Carbondale, Pa.

John G. Bannister, appointed a director, NATIONAL AUTOMOTIVE FIBRES, INC., Detroit.

Thomas D. Johnson, appointed to the sales application engineering staff, RELIANCE ELECTRIC & ENGINEERING CO., Cleveland.

Frank H. Burns, appointed assistant director of the Fisher Body Material handling and control section, FISHER BODY DIV., of General Motors Corp.

Ray F. Schwab, appointed director of purchases, ALUMINUM INDUSTRIES, INC., Cincinnati.

Ralph I. Lewis, appointed superintendent of Maintenance, PITTSBURGH STEEL CO., Allenport Works; and **Dennis Laborie,** appointed master mechanic.

Jack C. Limozaine, appointed superintendent, THE ENGINEERING & RESEARCH CORP., Riverdale, Md.

E. H. Horstkotte, appointed engineering consultant, Schenectady, area, MICHIGAN OVEN CO., Detroit.

Henry Kashman, becomes sales engineer, G. S. BLAKESLEE & CO.; and **Wilbur Thiess,** also becomes sales engineer.

Alfred E. Carpluk, joins the sales engineering staff, Boston office, Trumbull Electric Dept., GENERAL ELECTRIC CO.

Buell Whitehill, Jr., becomes personnel director, THE RUST ENGINEERING CO.; succeeding O. M. Rutledge, who has resigned.

S. Leonard Schwarz, promoted to superintendent, North Plant, DE LAVAL STEAM TURBINE CO., Trenton, N. J.

Carl H. Gerlack, appointed staff engineer, AMERICAN SOCIETY FOR METALS, Cleveland.

Clarence W. Fabel, appointed chief metallurgist, Atkins Saw Div., BORG-WARNER CORP., Indianapolis.

John W. Putman, appointed chief metallurgist, ENGINEERED PRECISION CASTING CO., Matawan, N. J.

Warren E. Porter, appointed manager, Commercial Engineering and Field Service Section, Track Equipt. Dept., PULLMAN-STANDARD MFG. CO.

OSCAR J. ELLERTSON, elected president, Pioneer Engineering Works, Inc., Minneapolis.

HERBERT JOHNSON, appointed vice-president — Administration, Jones & Laughlin Steel Corp.

ADAM J. HAZLETT, becomes executive vice-president, Jones & Laughlin Steel Corp.

UNIVERSITY OF MICHIGAN LIBRARIES

Arthur H. Branstad, appointed manager, fabricating plant operations, KAISER ALUMINUM & CHEMICAL CORP., Oakland, Calif.; and **David Mayers,** becomes works manager, Trentwood, Washington, rolling mill.

J. A. Wilson, Jr., appointed assistant chief engineer, C. A. NORGREN CO.

W. F. Jones, promoted to manager of secondary metals, Chicago office, CALUMET & HECLA, INC.

Jerome G. Brady, appointed manager, Pittsburgh District, KENNAMETAL INC., Latrobe, Pa.

Norman F. Melville, appointed general manager of sales, SUNBURY WIRE ROPE CO., Sunbury, Pa.

John L. Goheen, appointed district manager, Commercial Research on the West Coast, AMERICAN BRAKE SHOE CO., New York.

Kenneth E. Palmer, named district sales manager, Detroit office, PENINSULAR GRINDING WHEEL SALES CORP.

Charles J. Rittinger, appointed general manager, INDUSTRIAL CASTINGS CO., Detroit.

H. F. Tomasek, named sales manager, Pittsburgh Agricultural Chemical Co., New York, a division of PITTSBURGH COKE & CHEMICAL CO.

Fred C. Laubenheimer, appointed sales manager, Sheet Metal Specialty Div., FOLLANSBEE STEEL CORP.

John E. Manning, appointed western district manager, Promat Div., POOR & CO., Waukegan, Ill.

Curtis Meyer, becomes sales manager, Electric Hoist Div., HARNISCHFEGER CORP., Milwaukee.

Jack D. Colyer, appointed sales manager, BELLEVUE INDUSTRIAL FURNACE CO., Detroit.

R. G. Myers, becomes southwestern district manager, DAVEY COMPRESSOR CO., Kent, Ohio.

Theodor Wutscher, appointed chief designer, Rolling Mill Div., HYDROPRESS, INC., New York.

JOHN E. TIMBERLAKE, appointed vice-president-Sales, Jones & Laughlin Steel Corp., Pittsburgh.

JOHN D. WILLIAMS, elected vice-president and general manager Rollway Bearing Co. Inc.

JOHN T. DAVIDSON, elected vice-president, Engineering - Research Standard Register Co., Dayton.

ERNEST R. JOHNSON, appointed assistant vice-president in charge of operations, Republic Steel Corp.

SEND FOR 248-PAGE
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WILMOT
As Originators of Rivetless Chain, Wilmot Offers Widest Choice of Chain Sizes and Conveyor Attachments
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Presses with up to 50,000 ton capacity capable of forming a nearly finished wing section of an airplane—these are the goals of America's planemakers.

First in this program are the huge presses and this giant Midvale ingot is the initial part supplied to the press manufacturer. Cast in Midvale's open hearth furnaces this steel ingot measured 116 inches in diameter and was more than 24 feet high. Midvale craftsmen cast, forged, heat treated and machined this huge part to exact specifications.

Whatever your needs—parts to finished products—Midvale can assure you of precision production. Whether it is roll shells for the mining and cement industries . . . pressure vessels for the chemical and petroleum industries . . . rolls for the paper or steel industry . . . rings for turbines and gears . . . or castings and forgings for any industry . . . Midvale can make them to your most exacting requirements.

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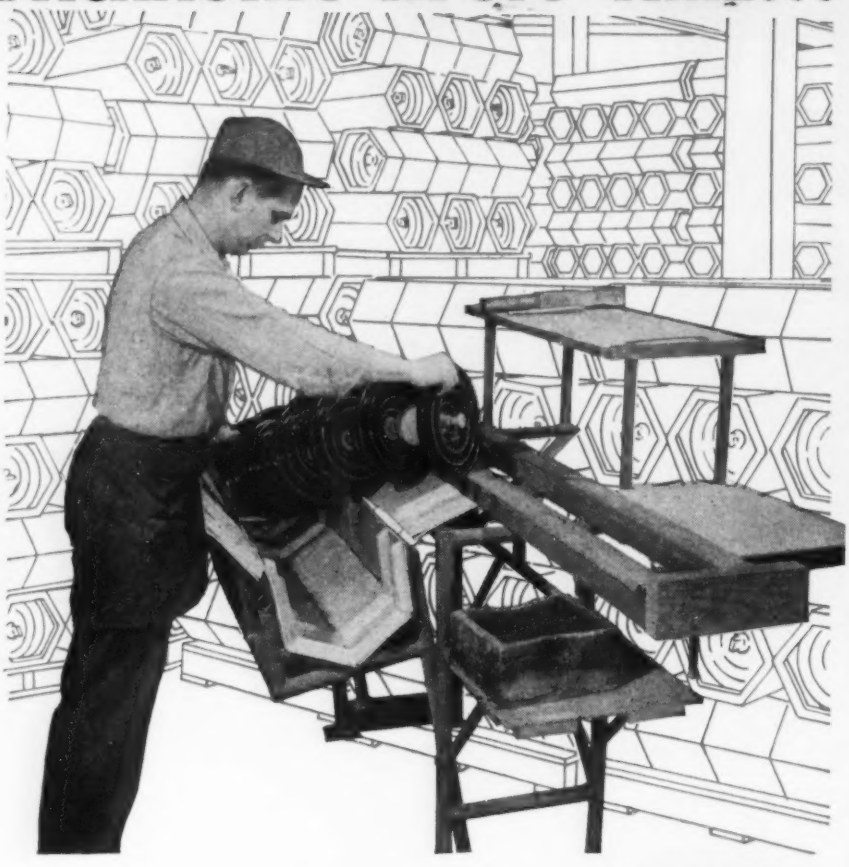
PACKAGING IN *JIG* TIME...



cut packaging costs 25%

with GENERAL ENGINEERED CONTAINERS

Packaging six porcelain insulators in a bulky nailed crate was a time-consuming two-man operation at Victor Insulators, Inc., Victor, New York. Introduction of the sturdy, lightweight General Wirebound Box and the jig-assembly system shown here enabled Victor engineers to reduce packaging to a quick, efficient, one-man operation, cut packaging costs by an estimated 25%. And their customers benefited by the substantial saving in on-site uncrating time—now a matter of seconds, thanks to General Wirebound Design.

This is only one example of hundreds of packaging problems solved each year—at a saving—in General Box Company's two fine Industrial Packaging Laboratories. General packaging experts stand ready to help *you* cut costs, too. Write today for complete details.

Find out how other manufacturers are cutting packaging costs. Write for your free copy of "The General Box."

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ENGINEERED SHIPPING CONTAINERS FOR EVERY SHIPPING NEED
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• Cleated Corrugated and Watkins-Type Boxes • Wirebound Crates and Boxes

—Personnel—

Continued

Gordon E. Tomb, appointed sales manager, SAN-EQUIP INC., Syracuse, N. Y.; and **Theodore G. Corbett,** named assistant sales manager.

Hugh H. Trumbull, appointed district sales manager, New England States, SOLAR STEEL CORP., Cleveland.

J. D. Kershaw, appointed district sales manager, Ohio, HANSON-VAN WINKLE-MUNNING CO., Matawan, N. J.

Joseph H. Jones, appointed assistant district manager, Central Alloy District, REPUBLIC STEEL CORP.

S. W. Crisman, appointed assistant district manager, Pittsburgh office, ELLIOTT CO.; and **John W. Anne,** elected a vice-president.

David A. Griffith, named assistant general manager, Pittsburgh Works, ALLIS-CHALMERS MFG. CO., Milwaukee.

A. Ward Jenks, appointed Detroit district manager, Pittsburgh Crucible Div., CRUCIBLE STEEL CO. OF AMERICA.

W. W. Reeves, named division sales manager, Automotive Div., FEDDERS-QUIGAN CORP.

Thomas E. McGuire, appointed sales representative, Chicago office, THE BILLINGS & SPENCER CO., Hartford, Conn.

John R. Welsh, appointed purchasing agent for ferrous scrap, AMERICAN BRAKE SHOE CO., New York.

OBITUARIES

W. Edgar Spear, 60, chairman of the board, Chiksan Co., at the Huntington Memorial Hospital, Pasadena, Calif., after a short illness.

Harlan H. Bradt, 62, mining promoter, developed Iron Chief Mine, at Eagle Mt., Calif., also founded Haile Mines Inc., and others, suddenly.

Clyde B. Dakin, 62, manager, Oldsmobile Forge Plant and also in charge of all General Motors forge and shell operations in Lansing, Janesville, Wis., and Kansas City, in St. Lawrence Hospital, Lansing, Mich.

Charles Lindmueller, 78, general manager, Metal & Thermit Corp., recently at St. Luke's Hospital, Chicago, after a long illness.

The Iron Age
FOUNDED 1855
Technical Articles

AUTOMATIC FURNACE HEAT TREATS High-Strength Torsion Bars

◆ Torsion bars for military track-laying vehicles must be strong, hard, tough and straight . . . These characteristics are achieved in bars processed automatically in a hardening-quenching-tempering unit.

◆ Constant sampling by hardness and fatigue testing, and Magnaflux inspection provides close quality control . . . Automatic controls keep an accurate check over each phase of process . . . Despite rigid specifications, rejects are few.

By Russell Graham
Vice-President
Maremont Automotive Corp.
Chicago

◆ TORSION BAR SPRINGS on military track-laying vehicles are subjected to extreme stresses and abuse. Under field conditions of rough terrain, open ditches and abrupt changes of speed and direction, the bars undergo constant flexing and rapid oscillation through their entire operating range. To withstand these conditions, optimum hardness control, a wholly tempered martensitic final structure and a scale-free surface with no decarburization are necessary. In addition, finished bars must not be distorted.

To heat treat these bars, the Maremont Automotive Corp., Chicago, uses the completely automatic handling equipment sketched in Fig. 1. It is capable of processing bars from 24 to 102 in. long, 1⅛ to 3 in. in diameter, with 4-in. splines. Due to the extreme length-to-diameter ratio, bars are processed vertically to prevent sagging or distortion.

Pit-type batch furnaces are usually used to heat treat parts of similar shape. At Maremont, it was decided not to use this method of processing because: (1) the large quench mass might quench unevenly and cause possible distortion, (2) the effects of air transfer to the quench, and (3) the handling involved. Therefore, a continuous heat-treating line, which meets all physical conditions and eliminates all handling, was designed and installed.

The Sunbeam Stewart furnace line consists of a gas-fired, radiant-tube, atmosphere-controlled hardening furnace followed by an automatic quench, and then a forced-type convection, recirculating tempering furnace. The unit occupies an area about 91 x 15 ft. The furnaces are about 12 ft high.

A structure containing a special mechanism for loading the furnaces is 35 ft high to permit top loading of the vertically suspended bars. This prevents the escape of protective atmosphere which is under slight pressure. Handling and heating are automatic from the time bars are placed on a horizontal charge table until they are lowered onto a discharge table.

Prior to heat treatment, bars are completely machined. Dimensional changes which may occur in them must be predicted accurately. Close tolerances are thereby maintained without subsequent machining operations.

An alloy steel hook by which the bar is suspended is screwed into a drilled and tapped hole in one end of each bar. The bars are then loaded onto a pivoted frame, four across, and hooked onto an alloy steel carrier which also rests in the frame. When the frame is raised, the bars hang

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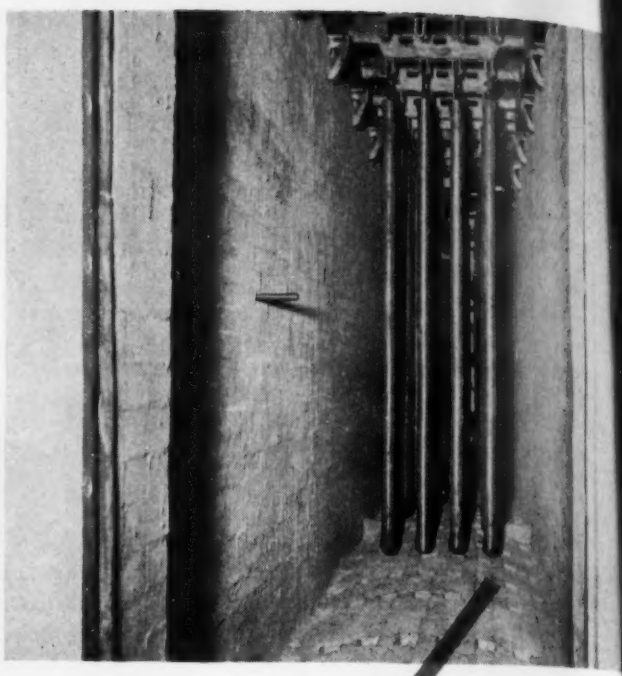
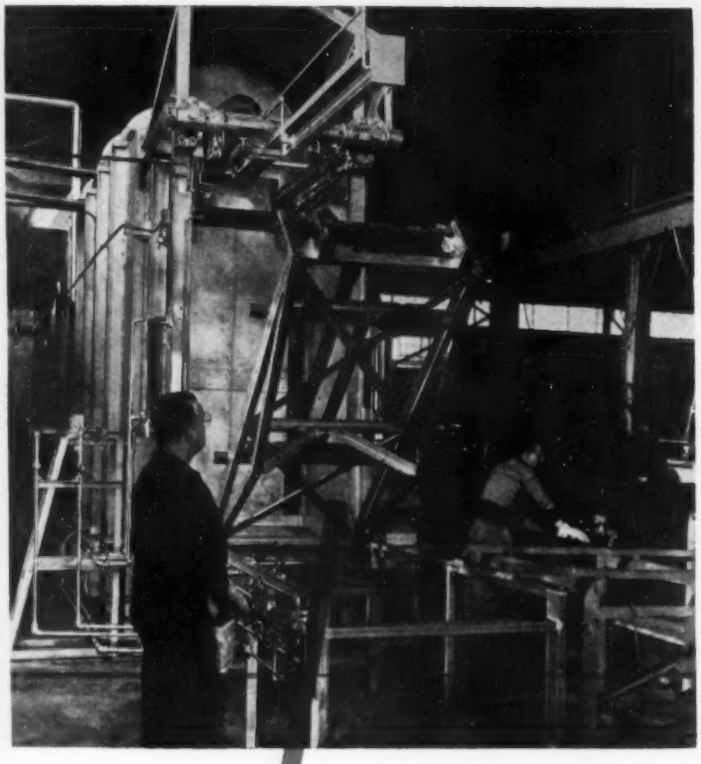
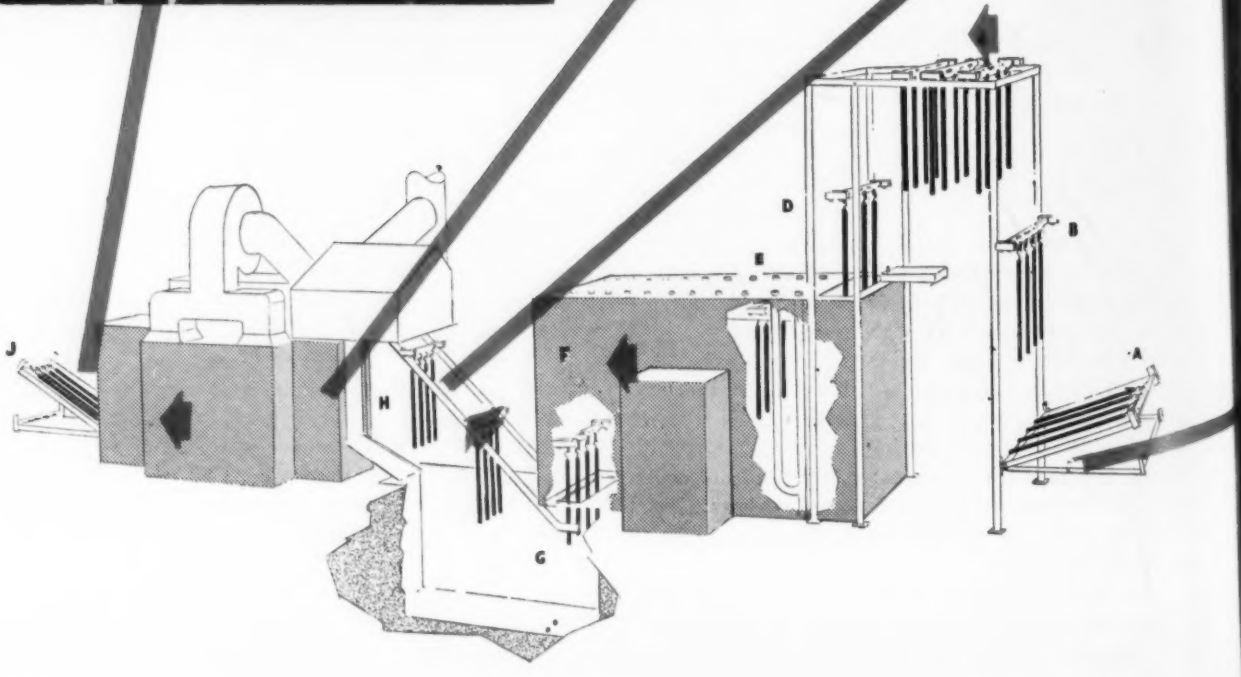
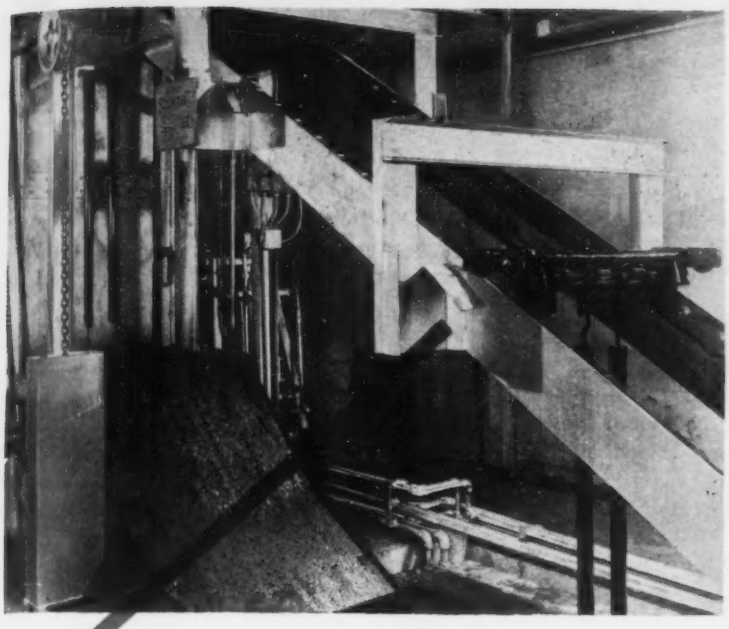
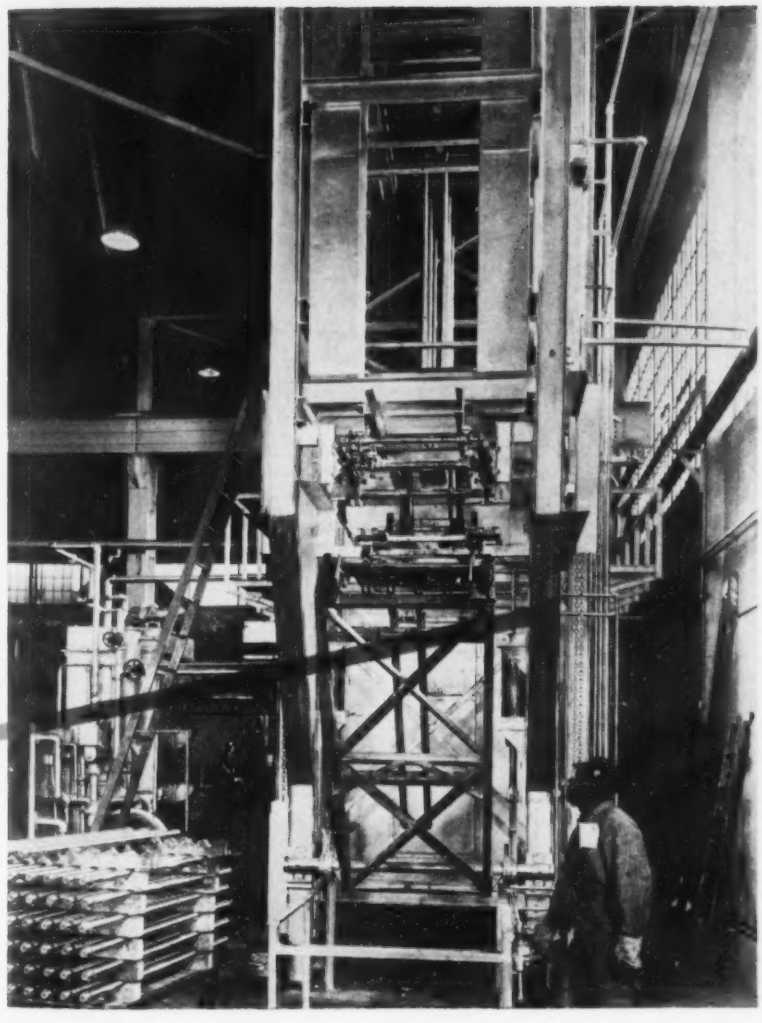
Automated handling of bars, and close process control maintain production with few rejects . . .











UNIQUE hardening-quenching-tempering unit automatically heat treats torsion bars under carefully controlled conditions. Bars are hooked onto carrier on pivoted frame A, brought to a vertical position and raised 28 ft by elevator B where transfer mechanism C positions them over furnace door. A second elevator D lowers carrier into furnace where drag chains pull it through furnace E and onto elevator in discharge chute F. Suspension of bars during heat treatment prevents distortion. Bars descend into oil quench G, and leave at a temperature of 300° to 500°F. They then move up on roller conveyer chains to tempering furnace H. From this forced convection unit they are lowered to a horizontal position by the pivoted frame J for unloading.

Text continued on next page

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Equipment is protected by automatic fire extinguisher system, lock-out switches . . .

in a vertical position. The carrier is pulled onto an elevator and raised about 28 ft where a transfer mechanism positions the carrier on another elevator over the loading door.

As the second elevator descends, the 2 x 4-ft loading door is raised from a sand seal and rotated out of the way by a cam and roller arrangement actuated by a hydraulic cylinder. The sand seal closes off the door opening to prevent atmosphere from escaping. During the entire transfer cycle, the door is open 50 sec allowing a gas loss of about 2500 cu ft per hr.

The same transfer mechanism which pulls the carrier from the frame onto the elevator extends through the furnace wall and pushes the carrier from the loading elevator onto the tracks. Carriers are then drawn through the furnace by drag chains equipped with disappearing dogs. Chains are pulled 12 in. at each index cycle and are returned by counterweights at the loading end. While in return, the dogs slip over the carriers to engage the next carrier. Alloys used for this mechanism are 35 pct Ni-15 pct Cr and 26 pct Ni-12 pct Cr.

The chamber of the hardening furnace measures 20 ft long x 5 ft wide x 9 ft high but the 15 radiant tubes along each wall limit usable width to 35 in. All tubes, except one, are U shaped and are fired top and bottom to maintain a uniform temperature of 1550°F. Leeds & Northrup pyrometers, operated from thermocouples in the loading and discharge areas, maintain a uniform temperature and provide a visual check as well as a permanent record of the process.

Maximum quenching with even cooling

A controlled atmosphere of 20 pct CO, 40 pct N and 40 pct H_2 protects the surfaces of the bars. An endothermic generator, consisting of two large alloy retorts filled with a nickel formate catalyst, is used in a chamber heated to 1860°F. The gas-air mixture is metered into the retorts via flowmeters which regulate the ratio. In the retorts, gas is cracked by catalytic action and heat from the burners surrounding the retorts.

After cracking, the gas passes through a cooler, a soot collector, a dry cooler, and then into the furnace heating chamber. An adequate volume of gas and air in the generator is assured by a Roots-Connersville gas pump and a Spencer turbo-compressor. Small quantities of natural gas metered into the cracked gas give a higher carbon potential.

The dew point of the generator is checked regularly to make sure that it is maintained between 0° and 20°F. Furnace atmosphere is analyzed periodically in a Burrell Gas Tester to make certain that the generator is operating properly and that the furnace is tight.

Bars reach a temperature of 1550°F when they have passed about three-fourths of the way through the furnace. The remainder of the heating period serves to soak the bars at this heat. A final pull of the drag chain positions the bars and their carrier on an elevator over the discharge chute which extends downward into the quenching medium.

Maximum quenching with even cooling is important. To accomplish this, violent agitation takes place within the discharge chute. Temperature of the quenching oil is maintained at 125° to 150°F by recirculating it through a cooling tower. The elevator is lowered into the oil at a constant rate. When it reaches the bottom of the chute, the fixtures are transferred automatically onto twin intermittent roller conveyor chains and carried upward.

Checked for hardness

The bars travel at a rate so that their temperature is 300° to 350°F when they leave the quench. Excess oil drains from the bars when they are being elevated and transferred onto the tempering furnace conveyor. At this point, bars are removed periodically and checked to see that their as-quenched hardness is held at Rc 60 to 61.

The Sunbeam Stewart forced-convection tempering furnace uses two separate gas-fired combustion chambers and individual high-temperature recirculating fans. Heated gases are forced into a refractory-lined distribution chamber below which extends the full length of the heating chamber. These gases then flow through a refractory grid which serves as the floor of the heating chamber. It also provides uniform distribution and velocity as the gases flow upward, past the bars, and returned via the recirculating fans to the combustion chambers.

The heating chamber of the tempering furnace is similar in size and shape to that of the hardening furnace but is 6 ft longer. The transfer mechanism is also similar except for loading and discharge which are done at track level. Access is by means of doors which open sideways at both ends. Heat-resistant iron is used in this mechanism rather than a nickel-chrome steel.

After leaving the tempering furnace, bars lower automatically into a horizontal position on a pivoted frame. Tempering, done at about 800°F, produces a hardness of Rc 46 to 49. Samples are checked for hardness and all bars are magnafluxed to assure soundness.

The hardening furnace is protected from gas or air-supply failure by a North American duplex shut-off valve; the quench from oil fires by a Kidde CO_2 automatic extinguisher setup. Bristol Safeguard equipment protects the draw furnace from failure of the flame, blower or recirculating fans. Mechanical mishaps are prevented by lock-out switches.

Oxygen enriched blast—

Construction of LOW-SHAFT BLAST FURNACE Nears Completion

◆ Built to utilize low grade ore, this new furnace does not require metallurgical coke . . . Furnace will make 60 to 100 tons of iron per day.

◆ Designed to use a maximum oxygen enrichment of 50 pct, the furnace will consume about 45 tons of oxygen a day . . . Charge must be blended into a homogeneous mixture . . . Oval shape 3 m in diam believed best type of design.

◆ BLAST FURNACES keep growing taller. The advantages of this increase in height are real because the thermal efficiency, in particular, is improved. But because of its height, today's blast furnace requires a fuel having good resistance to crushing and impact. The production of metallurgical coke for blast furnaces requires coal of specific qualities which is being rapidly exhausted. Moreover, the heat units from coke cost about 40 pct more than those obtained by the direct combustion of coal. Thus, the thermal balance in blast furnace operation is no longer such an outstanding economic factor as it once was.

Proper operation of the blast furnace still requires that the raw materials in the burden be of a certain size. That is why the proportion of fine ore or fine coke that can be used is relatively small. The quantities of such fine raw materials found on the market are increasing, however, and there is evidence that this situation will become more serious in the future. Agglomeration of fine ores, now being done by some companies, has effected one solution to a part of the problem of utilizing these materials. However, agglomeration is costly and is only a partial solution to the general problem, since it ignores entirely the utilizing of less valuable coals in iron smelting.

Specialists associated with important iron and steel problems have sought a more general solution to these problems. They have even contemplated the use of new production processes. After various studies, they suggested the utilization of inferior raw materials in a furnace having a low shaft so that fuel of low resistance to crushing could be substituted for metallurgical coke.

For high thermal efficiency in the low shaft furnace, the gases must be emitted at a temperature as low as that of the blast furnace. This requires that the temperature gradient within the furnace be raised and suggests that an attempt be made to operate the low-shaft blast furnace with a blast enriched with oxygen. The use of an oxygen enriched blast has the additional advantage of decreasing the gas flow rate which

TABLE I

WHY A LOW-SHAFT FURNACE?

ADVANTAGES

1. Consumes a more abundant and less expensive fuel.
2. Consumes fine ores.
3. Furnishes a richer gas.

DISADVANTAGES

1. Requires a large supply of oxygen.
2. Requires a physically, and possibly chemically, prepared charge.

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reduces the amount of dust loss. This is an absolutely necessary item when working with large amount of fine material in the burden.

The low-shaft blast furnace probably will not provide the degree of drying of the charge and carbonization of the iron which takes place in conventional blast furnaces. Therefore, the charge must be prepared both physically and chemically for good operation. Because of the small volume and the rapid flow of material through the low-shaft blast furnace, irregularities in the physical state of the charge cannot be tolerated.

The low-shaft blast furnace blown with oxygen will probably furnish a gas of higher calorific value. Such gas will be worth more for heating and might possibly serve as a raw material in the chemical industry for certain synthetic products. The proportion of carbon monoxide in the gas will probably be greater than in conventional blast furnace gas, but this need not be a serious disadvantage since the fuel used will definitely cost less than metallurgical coke. The advantages and disadvantages of such a furnace are compared in Table I.

No industrial installation of this type of furnace has been made to date because (1) the large amount of capital which must be invested in order to obtain results having any significant value, and (2) the relatively high cost of manufacturing oxygen necessary for enriching the air.

Recent improvements in the production of oxygen from atmospheric air have effected a noticeable decrease in its cost of manufacture and have increased the desire to begin tests on the low-shaft blast furnace. The problem of investment capital still remains unchanged. Tests on a small scale, although expensive, have not been able to yield decisive information on the economic value of the low shaft furnace.

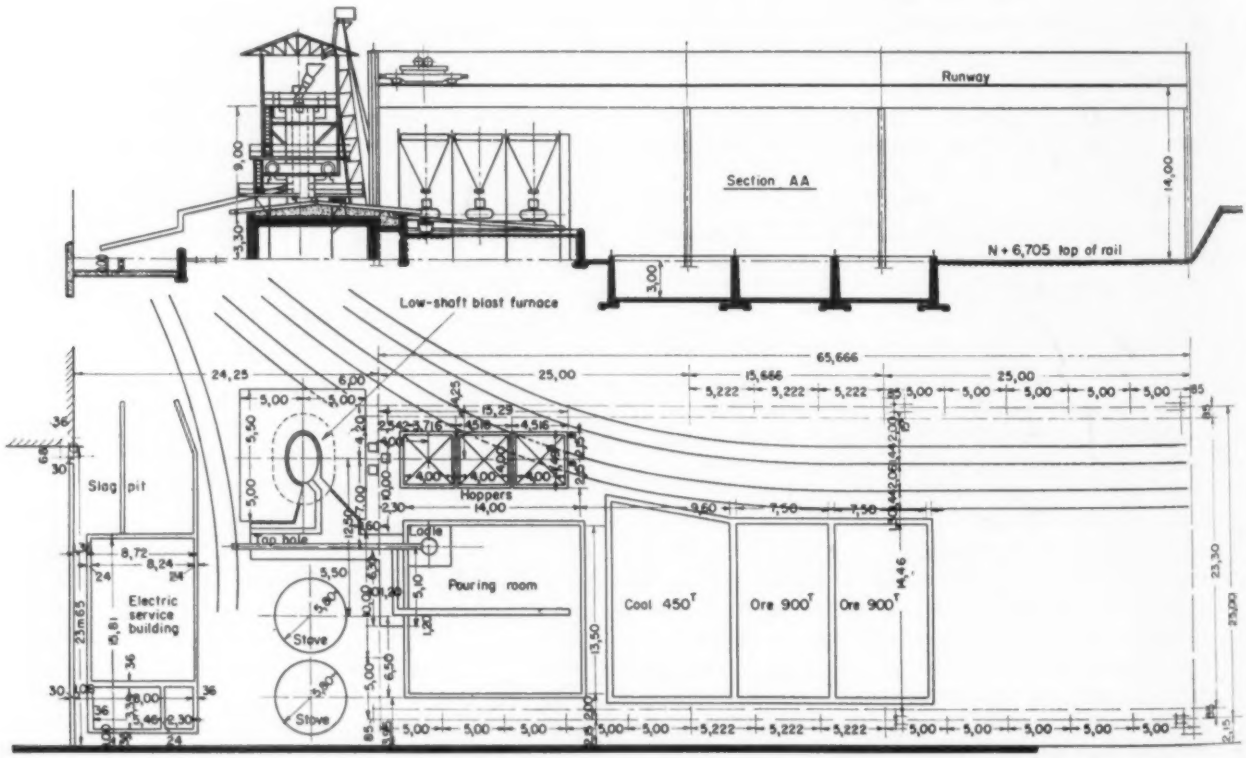
Since it is necessary to plan for research of this nature on a semi-industrial scale, no European country was in a position to assume the necessary expenditures by itself. The general problem was aggravated by the fact that no one was certain that the low-shaft blast furnace, operated with oxygen enriched air, is economically practical.

In 1950, the Organization for European Economic Cooperation set up a commission whose aim was to promote the development of applications for oxygen in industry. Industry members

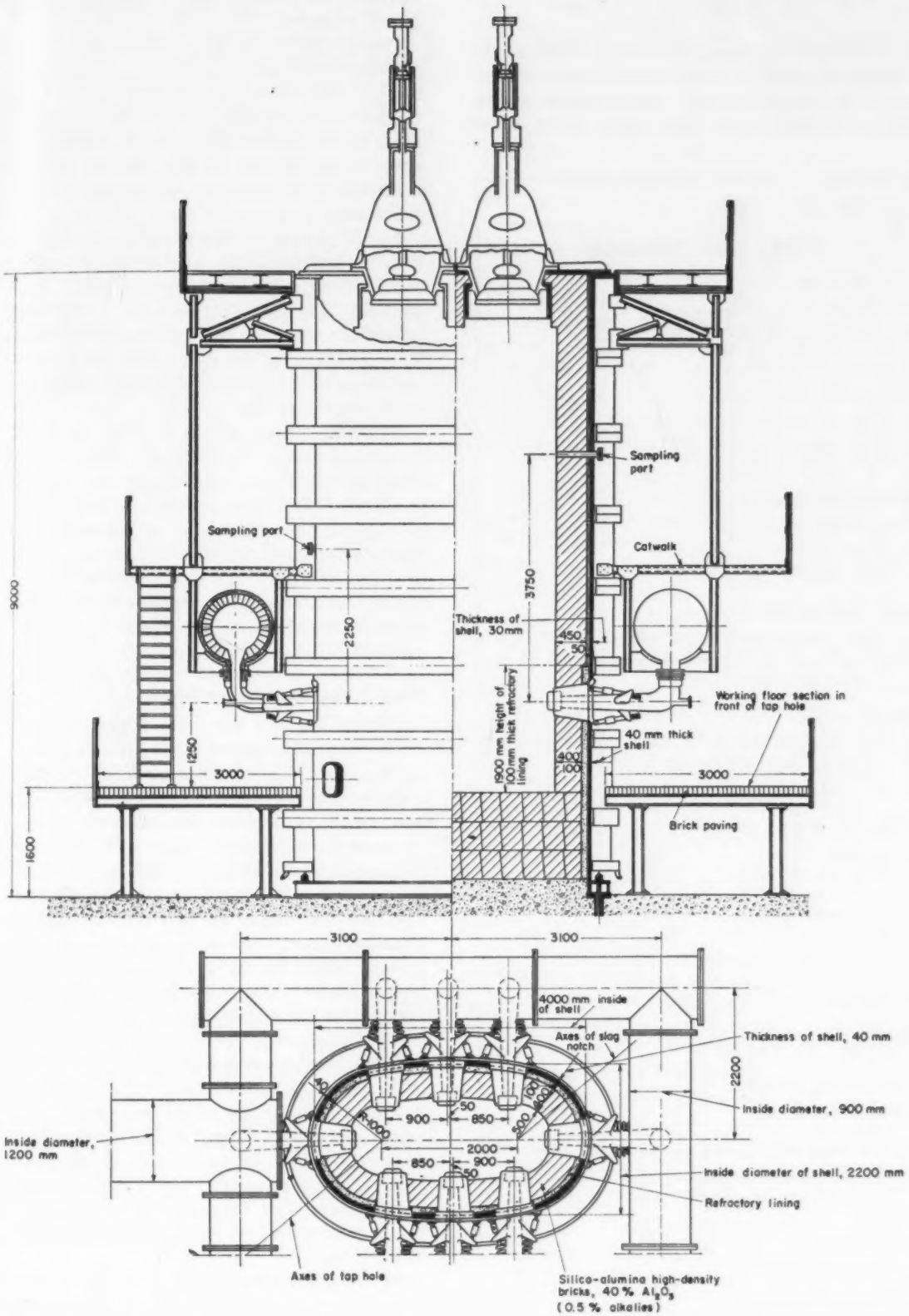
TABLE II

LUXEMBOURG (pct) ORE ANALYSIS

Fe	CaO	SiO_2	Al_2O_3	P	S
32.0	16.0	8.0	6.0	0.7	0.05



GENERAL PLANT LAYOUT is designed to permit optimum materials handling of 100 pct prepared burden.



NOVEL OVAL shape is restricted to 3 m diam. This shape may indicate later possibilities of using a rectangular shaped low-shaft furnace. The peculiar shape of this furnace is an innovation.

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Principal interest in low-shaft furnace was for basic Bessemer pig iron using low value fuels . . .

of this commission suggested that no study would be better adapted to international research than that of the low-shaft blast furnace operated with oxygen enriched blast. This study would affect all pig iron producing countries. If costs are divided among several countries, the financial outlay would not be too high. This suggestion was received favorably, and it was decided to examine the possibilities of setting up the projected research.

TABLE III

DETAILS OF FURNACE

1—Production:
Pig iron: 60 to 100 tons per day
Slag: 60 to 120 tons per day
Gas: 18,000 m^3/hr NTP

2—Consumption:
Ores: 250 to 350 tons per day
Fuel: 60 to 100 tons per day
Blast: 14,000 m^3/hr NTP

3—Horizontal section:
Oval shape
Large axis: 3 m
Small axis: 1.20 m

4—Vertical section:
Shape: rectangular (vertical walls)
Height of charge: 4 m above the tuyeres
Depth of crucible: 1.35 m

5—Refractories:
Quality: silicoaluminum: 40 pct Al_2O_3 without alkali
Width of walls: 50 cm
Thickness below crucible: 1.20 m

6—Blast tuyeres:
Number: 8
Diameter: 100 mm

7—Slag tuyeres:
Number: 2
Position: On small sides

8—Tap holes:
Number: 1
Position: On small side

9—Operating pressure:
0.5 to 2.3 kg/cm^2

10—Provision for sampling in the stack:
Planned at different levels between the tuyeres and the top of the charge.

11—Chilling:
By running water

12—Charging apparatus:
Number: 2
Type: Double locking Pintsch box (a valve and a bell)
Capacity: 800 liters per skip

One of the first problems which arose was that of furnishing the oxygen necessary to enrich the blast. The National Metallurgical Research Center, Liège Section, had conducted research on basic Bessemer steel and had perfected new processes for converting pig iron to steel, using either a blast enriched with oxygen or gaseous mixtures containing large quantities of oxygen.

Large plants to supply oxygen for the industrial application of the new processes were under construction. Having large quantities of oxygen available, the Liège plants were well situated to undertake tests on the low-shaft blast furnace. They volunteered to carry out the tests under the auspices of the Belgian National Metallurgical Research center.

Seven countries united to form an "International Committee for Research on the Low-Shaft Blast Furnace" and undertook to furnish the funds necessary for research. This committee at its inception consisted of representatives from Austria, Belgium, France, Greece, Holland, Italy and Luxembourg. To avoid confusion, this International Committee, although it was originally a committee of the OEEC is now both financially and administratively independent.

Would use low value fuels

For the western European countries, the principal interest in the low-shaft blast furnace is for basic Bessemer pig iron using fuels of low value, notedly, semicokes, small fines, lignites, etc. Fine ores would come from the small mines of Lorraine or Luxembourg, along with blast furnace dust, pyrite residues, etc. The size of materials to be used would start in a range of 10 to 20 mm, although tests would be aimed to increase the amount used of 0- to 10-mm sizes. Eventually a study would be made of the production of pig iron or of iron alloys from ores, such as chromiferous ores from the Congo, which are difficult to treat by standard means.

A low-shaft blast furnace capable of producing on the order of 60 to 100 tons of pig iron per day and of operating for about two weeks per run was chosen. This length of run seemed sufficient because the passage of charges in the low-shaft blast furnace is much more rapid than in the conventional blast furnace. It is estimated that the heat time in the low shaft furnace would be about 2 hr.

By using ore from the small mines of Lorraine or Luxembourg, an ore charge of 250 to 300 tons would be necessary to attain the production of 60 to 100 tons of pig iron per day. The average analysis of such ore is shown in Table II.

Two assumptions were made (1) the thermal efficiency would be satisfactory, (2) the consump-

tion of carbon would be around 1000 to 1500 kg/ton of pig iron.

Not knowing the proportion of indirect reduction, the technical staff decided to plan for a high air flow on the order of 14,000 cu in. per hr. The maximum pressure of the operation can be 2.3 kg per sq cm. Finally, the quantity of oxygen necessary was determined by assuming a maximum enrichment of the blast of 50 pct which corresponds to an oxygen consumption of the order of 45 tons per day.

The Committee has considered it necessary to plan to carry out the research in two stages, (1) the low-shaft blast furnace will be operated on a mixture of raw materials without agglomeration, (2) the charge will be prepared by obtaining a homogeneous mixture of fine ores and coals which is subsequently agglomerated, using a bonding material or pressure and possibly sintering to eliminate the volatiles in the bonding material and fuel.

Materials must be blended

The initial plant for storage and for handling raw materials would require a building to hold sufficient charge for 5 operating days, or 1750 tons of ore and 500 tons of fuel. The excess of charge material above these amounts will be stored either at the port or at the mines. The building will also house the pouring floor and the installation which is expected to be used for preparing the charges. The raw materials as received will have the desired size of either 10 to 20 mm or 0 to 10 mm.

To prepare the charge will require that the raw materials be stocked temporarily in quantities of 100 to 150 tons in three 30-cu m hoppers. Withdrawal from the hoppers and weighing of the materials must be done in such a way that the materials can either be blended into a homogeneous mixture or can be charged individually into the furnace in intermittent layers.

For blending, the charge will be prepared in a helical mixer. The installation is designed so that the mixer receives the previously weighed raw materials from a collecting belt on which the materials are disposed in superimposed layers.

The raw materials are charged to the blast furnace using two identical skip arrangements, the capacity of each skip being determined on the basis of the volume of material in each charge layer or 800 liters.

A low-shaft blast furnace with an oval cross-section was constructed. The oval shape was chosen because it appears this shape may provide some information on the possibility of using rectangular low-shaft blast furnaces should it be necessary to increase the production of the furnace while maintaining a constant width. It is believed that the width of the low-shaft furnace should not exceed the value close to that of the present design. This low-shaft blast furnace, as defined by the Committee, possesses the characteristics shown in Table III.

In order to obtain a wide range of pressures, two blowers will be installed. One turboblower will supply 9000 cu m of air per hr at a pressure of 2.5 kg per sq cm. It will be particularly suited if the air is to be slightly enriched with oxygen. The other is a combination of two centrifugal blowers capable of furnishing 14,000 cu m of air per hr at either 4000 or 2000 mm of water.

The blast will be reheated in two stoves each with two zones of 5 m diam and a height of 15 m. These stoves are designed to operate under pressure and will make it possible to attain blast temperatures of the order of 800°C.

The pig iron will either be collected in a ladle or be cast in sand pigs in a casting area of about 100 sq m in size. The slag will be granulated in buggies with also the possibility of collecting it in a pit.

Since the pilot plant is near the blast furnace division of Ougree-Marihaye, this company will supply water, steam and purified gas to the low-shaft blast furnace as well as the electric power. The drawings show a general plan of the pilot plant and the design of the low-shaft blast furnace. The exploratory period covering the design of the plant is coming to an end. The construction of the plant is started. There is every reason to believe that this pilot plant will be ready to begin operations soon.

The problem taken up by the International Committee is very difficult to solve because the shape or, at least the cross-section of the blast furnace is so unusual. The same may be said of the charging process. Although it has proved itself in the case of gas generators under pressure, nevertheless, it constitutes an innovation in the eyes of blast furnace engineers. Moreover, the raw materials and the characteristics of operation (high pressures, oxygen enrichment, recycling of gases) pose numerous problems. Thus, the final result cannot be foretold and the Committee is faced with the problem of "pure research" with all the risks and uncertainties.

This article is based on a report of the Steering Committee, International Committee For Research on The Low-Shaft Furnace.

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Hidden profits—

Don't Overlook FRINGE BENEFITS of Machine Tools

By Donald M. Pattison
Sales Vice-President
Warner & Swasey Co.
Cleveland

◆ Fringe benefits of new machine-tool replacements often outweigh savings in direct labor . . . Overlook them and your chance for profit may pass by the boards.

◆ Saving in floor space, less indirect labor, fewer operations and lower maintenance costs are only a few factors in replacement arithmetic . . . Small scrap loss and less inventory are key benefits in many plants.

◆ EMPLOYERS OFTEN SAY that employees don't realize the importance of fringe benefits—all they think about is the hourly rate. But employers themselves sometimes take the same view, particularly with respect to purchasing new machine tools. Management tends to judge replacement results solely on savings in direct labor, failing to properly assess the fringe benefits.

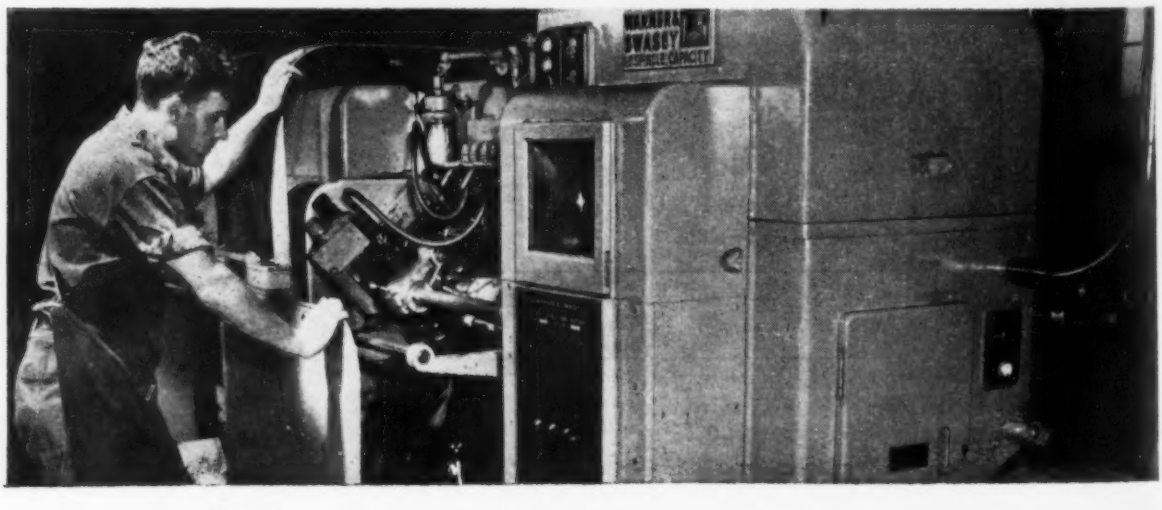
Machine tool builders are contributors to this attitude. Their traditional method of presenting figures on machine tool replacement has been to show the reduction in direct labor cost per piece produced on a new machine as compared to the old machine. Unfortunately, this left an impression with many machine tool buyers that a saving in direct labor cost is a governing factor as to whether replacement is or is not desirable.

This is definitely not always the case. In some situations fringe benefits actually outweigh savings in direct labor. In every case, fringe benefits should be explored and totaled on an estimated dollars-and-cents basis, otherwise many benefits of replacement are completely overlooked.

Saving in floor space effected by replacing obsolete machines by fewer modern ones which turn out more work in less room is a fringe benefit. Under some circumstances, it may be a major benefit. Suppose expanding operations necessitate a plant addition. Building is expensive and it takes time. If the larger output could be handled satisfactorily in existing space, savings would be high and replacement well worth the effort.

One firm, making stainless steel valves for the chemical industry and faced with this problem, studied replacement. As a result, it saved the cost of plant expansion which might have run well over $10,000 by putting work from five turret lathes on one new five-spindle automatic

FIVE-SPINDLE AUTOMATIC bar machine does the work of five turret lathes which would have required plant expansion at an estimated cost of $10,000. Unit is in plant of Alloy Steel Products Co.



FRINGE BENEFIT SAVINGS

In one plant, a new No. 6 vertical mill replaced an 11-year-old No. 4 milling machine. Savings after 1 year were:

BENEFIT	ANNUAL SAVING
1—Some jobs too large for an old machine were put on expensive machines which had a lower rate of operation. The new No. 6 mill is more suitable and has better work-handling capacity.	$1669
2—Greater accuracy reduced set-up time on subsequent operations	1819
3—Inspection costs were lowered by improved accuracy	160
4—Less scrap loss	500
5—Difference in maintenance and down-time cost	300
Total	$4448

bar machine. Easier storage and better work quality were additional fringe benefits.

Where overcrowding is evident, floor-space fringe benefits should be studied as part of replacement arithmetic. Savings can result by allowing more freedom of movement for operators and more space to handle jobs properly. Such increase in efficiency can be figured on a dollar-and-cents basis.

Another firm bought six multispindle automatics to replace 16 obsolete machines. Only replacement offered a solution. There were also some savings in labor costs, material handling and storage. The net saving was $90,000 per year as against a capital investment of $130,000. Floor space in this case was a primary consideration.

In many plants indirect labor is an intangible factor, the cost of which is not properly broken down and allocated. Indirect labor cost is substantial and often a large share of the total. For example, if old machines have been presenting accuracy problems, it is probable that new machines would require fewer inspectors due to more consistent accuracy. If replacement is done on a group basis and fewer machines are in operation, chances are that fewer set-up men will be needed.

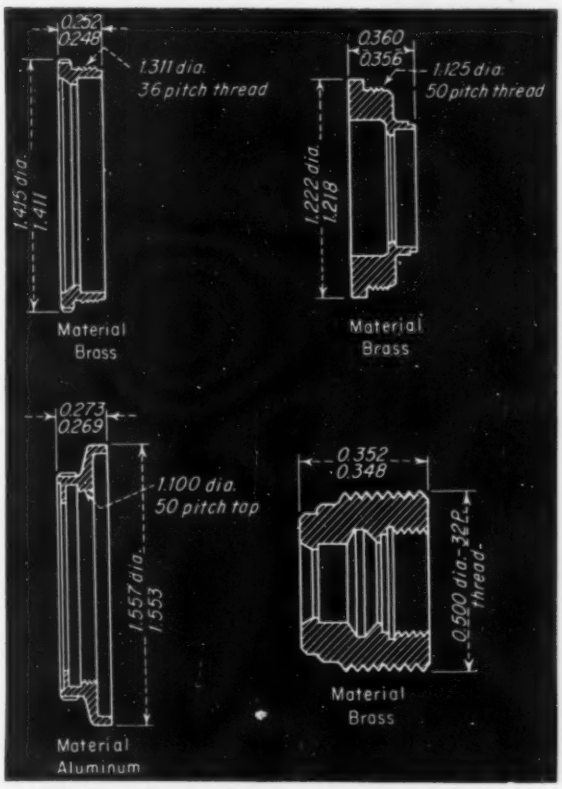
There are some labor savings beyond direct labor savings of operators of the machines in question. Replacement of old machines by new ones may reduce the number of operations after work leaves the machines.

One of the largest instrument manufacturers, using a battery of multispindle machines, requires fine finishes and close tolerances on parts plus many and varied operations on each piece. The real saving as against previous methods was in the elimination of subsequent operations now done in the first machining operation.

Savings in maintenance costs can be a high figure in a replacement analysis. There are factors such as the operator's wage if he is not producing during repairs, cost of the maintenance man's time and the substantial cost due to lost production of other machines depending on flow of materials from the machine being repaired. The last factor is important to auto producers whose lines depend on a constant flow of component parts.

The difference in scrap loss between the old method and that estimated for a new machine is another important factor. This is especially so with the expensive casting or if the part has been previously machined. An industrial gas-engine manufacturer scrapped one crankshaft out of ten in a tapping operation following other expensive machining. A precision tapping machine reduced this loss to one out of a hundred. Against these figures, the direct labor saving was a drop in the bucket.

What about inventory? A faster work flow means less inventory—and carrying inventory is added expense. And what about operator morale? Good new machines stimulate operators to take more pride in their work and step up their output. Nobody likes to work on an old "klunker." Is work being done in two successive operations which could just as easily be done by adding a special fixture to a new machine? These are some of the other factors worth thinking about.



INSTRUMENT PARTS must be made to exacting tolerances and have fine finishes. These typical parts previously required several operations on a variety of machines. All operations are now performed on a five-spindle automatic machine.

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Lapping eliminated—

LARGE GEARS produced faster, cheaper and more accurately

◆ Large gears up to 15 ft diam x 5 ft wide are now being produced with greater accuracy and lower costs . . . Revised production methods eliminate lapping operations . . . New vertical gear shaving machines handle gears with machine diameters from 48 to 180 in.

◆ Finishing time is reduced at least 75 pct . . . Checking devices determine mating characteristics before the gear is removed from the gear finishing machine . . . Dual tooling cuts production time almost in half.

By F. P. Hennessy
Methods and Equipment Supervisor
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◆ DEMAND FOR GREATER accuracy in large gears is steadily increasing because of the need for quieter operation, higher tooth loads and longer gear life. The higher the operating speeds of the gears, the more important noise reduction becomes. Higher tooth loads can be carried on more accurate gears since they lower dynamic loads caused by tooth inaccuracies. Also, higher tooth load gears are smaller, lighter and cost less, resulting in space, weight and cost savings. Life of accurate gears is far longer than that of inaccurate gears, since inaccuracies can cause various types of tooth failures. In recent years this demand for accurate large gears has become so pronounced that General Electric Co.'s gear manufacturing section reanalyzed its large gear production to find new methods and equipment which would achieve greater precision at less cost.

Industry procedure for making quiet gears of large sizes formerly called for producing each gear as accurately "as possible" with available equipment. Inaccuracies were then corrected by tedious and time-consuming lapping with cast iron laps. To achieve the needed mating contact, further lapping together of mating gears or pinions was performed. In GE's approach to the problem, the idea of producing final accuracy by lapping has been abandoned. The needed precision is achieved by processes which provide inherent accuracy in each gear before it is assembled or mated with others. The first step in development of these processes called for finding out the exact accuracies which had to be controlled to achieve precision gear mating. This made necessary the determination of what to check, how to check and when to check gears as they pass through various production operations. The next step was to find equipment and procedures which would produce the required control at various manufacturing stages. Newly developed methods and equipment are now producing gears up to 15 ft diam x 5 ft wide which meet the following specifications:

1. Accuracies of tooth spacing to within 0.0002 in.
2. Accuracies of tooth form, runout, etc., to within 0.0003 in.
3. Practically perfect mating contact under load in working area.
4. Tooth surface finish averaging 12 to 20 microinches as required.
5. Reduced elapsed production time, machine cycle time and cost.

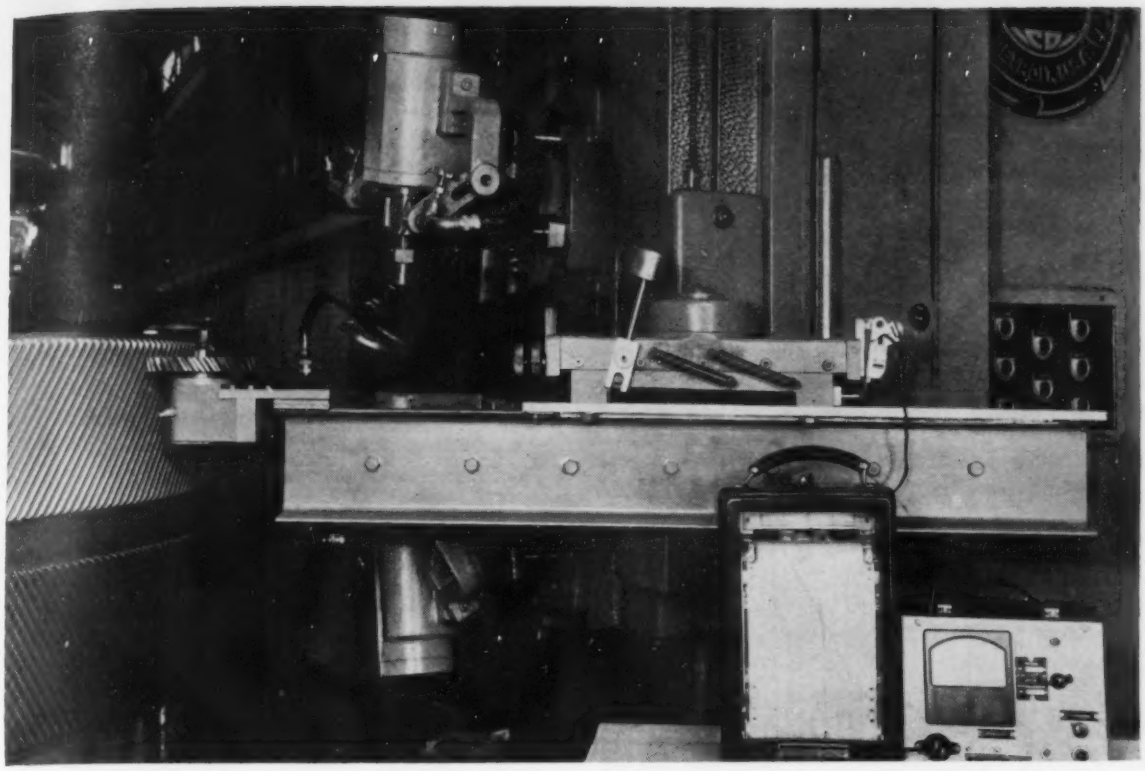

FIG. 1—This gear rolling fixture attached to the gear shaving machine indicates form and pitch diameter eccentricity of a production part with a master gear. A portable profile checker is also used.

The advantages of the new process can be judged by some of the problems that have been eliminated. In former methods considerable difficulty was encountered in correcting helix errors. When gears were lapped with cast iron laps and mating parts, the amount of the error had to be lapped off. Under these conditions, correct involute profile was hard to maintain. Tooth surface finish obtainable with lapping was rarely better than 40 microinches. Time required for lapping large gears was sometimes as high as 300 to 400 hr. Multiple gear lapping stands formerly needed are no longer required by the new method. It also releases considerable hobbing equipment and eliminates the time formerly required for hobbing of gear laps. Just what is entailed in the new procedures and equipment can best be shown by taking a single gear, the large main drive gear of a turbine propulsion assembly, through the various steps in reverse order. This herringbone gear has a 12.3 ft diam, a total face width of 41 in., 3 diametral pitch, weighs approximately 60,000 lb and has 445 teeth.

The last step in producing this gear is checking its mating contact. This is primarily a routine check since the mating characteristics are determined before the gear is removed from the gear finishing machine. For this purpose the gear finishing machine is equipped with a number of checking devices. These include: a gear rolling fixture, Fig. 1, which indicates the form and pitch diameter eccentricity of a production part with a master gear; a device for checking outside diameter and journal eccentricity and axial pitch; and a special profilometer developed for checking the gear while still on the shaving machine. This profilometer has a special guide so that it can be moved along a tooth at the pitchline, crossing the tool marks from the shaving cutter to check the worst possible conditions as to surface smoothness. A portable profile checker

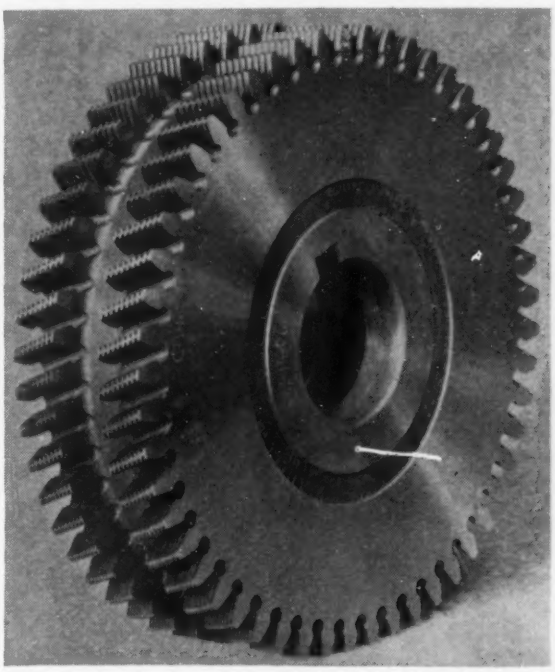

FIG. 2—On this twin-faced shaving cutter, one face helps guide the other, giving better helix correction while both work on different parts of the gear face.

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is also used. With the new shaving equipment a required surface smoothness of 12 to 20 microinches is obtained. These checking devices make it possible to determine the contact that may be expected from the gear before it is removed from the shaving machine.

Basically, the function of the gear finishing operation is to correct remaining inaccuracies that may interfere with full mating in a gear. To do this, it was necessary to set up specifications calling for extreme accuracies within the shaving machine itself. For instance, the total table runout at a point 180° from the cutter had to be specified as not more than 0.0003 in. even on the largest machine, capable of shaving 15-ft gears. On some of the smaller shavers, for gears up to 4 ft, the table runout actually checks to 0.00015 in. The same tolerance specification, 0.0003 in., was also applied to the top of the table. Four sizes of these shaving machines, specially designed and built by Michigan Tool Co., are used for gears having machine diameters of 48, 72, 120, and 180 in.

A new type shaving cutter with twin faces is shown in Fig. 2. One face helps to guide the other, giving better helix angle correction but both work on different parts of the gear face at the same time. To further decrease shaving time, each machine is provided with two cutters of this twin type. The new shaving equipment makes it possible to produce gears with tooth profile modification to insure quiet and smooth operation at high speeds.

Finishing time has been reduced at least 75 pct with an increase in accuracy with the new shaving equipment. An important point to remember is that shorter hobbing and finishing cycles within the limitations of cutting speeds and feeds inherently improves accuracy. The more rapid the operation, the less variation in these very large machines due to changes in temperature.

The precision obtained with the new shaving equipment has made it possible to materially reduce hobbing time, since multiple thread hobs can now be used. They could not be used and still obtain desired accuracy and finish when the gears were finished by lapping.

The hobber, see Fig. 3, like the shaving machine, employs two cutters. The principle of dual tooling is applied in every processing step, cutting production time practically in half. On the hobber, one hob feeds up, the other on the second stanchion, feeds down. As on the shaving machine, the final hobbing operation is checking the gear for tooth thickness. Approximately 0.001 in. to 0.004 in. is left for shaving depending on the tooth size of the gear.

Maximum life for hobs

Hobbing is done in two steps, roughing and finishing, using plain hobs for roughing and preshave hobs for finishing. This gives maximum life on both roughing and finishing hobs even though on these large gears, the hobs are sharpened after every gear cut to insure continuity of accuracy. This hobbing machine was designed and built by the General Electric Co. The stanchions are mounted on scraped ways to permit rapid center distance adjustment.

One of the important phases of gear manufacture is the attainment of nearly perfect dynamic balance of all rotating parts. General Electric is the only gear manufacturer to balance dynamically all its large gears. Special types of balancing machines are available to accommodate gears with diameters up to 200 in. Fig. 4 shows a bull gear on a dynamic balancing stand. While the gear is rotating, an indicator indicates the magnitude of unbalance. The calcimine on the shaft is marked to show the location of the unbalance. The equipment is sufficiently accurate to

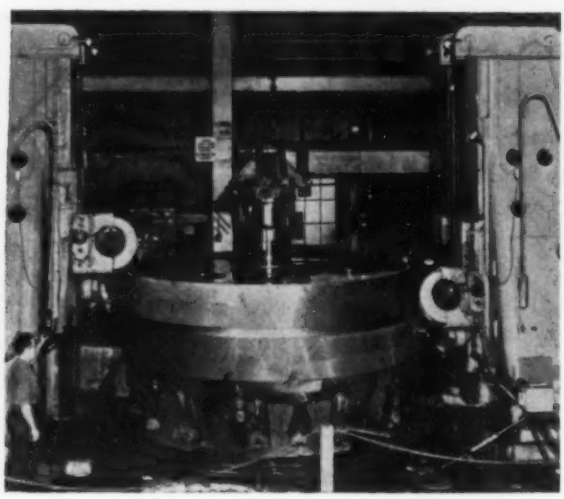

FIG. 3—This GE-built hobber, like the shaving machine, employs two cutters. One hobs feeds up, the other down. Rough and finish hobbing are performed.

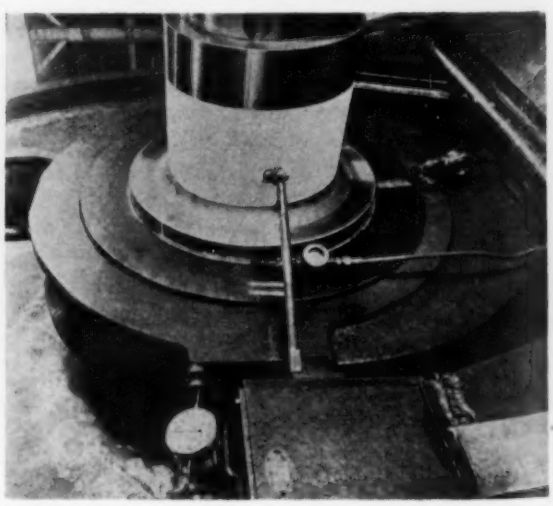

FIG. 4—Bull gear on dynamic balancing stand. This equipment permits accurate balancing of a large 30-ton, 12.3-in. OD gear to within 5 oz. at the rim.

permit balancing of a large 30-ton, 12.3-in. OD gear to within 5 oz at the rim.

Both gear cutting and finishing are performed with the axis of the gear in the vertical position. Prior operations, including balancing, are performed with the axis horizontal. This transition is simplified by the operation shown in Fig. 5. In this trunnion fixture, an adaptor is attached to the end of the gear shaft to permit handling of the gear by an overhead crane.

Dual tooling shown in Fig. 6 is used in machining the gear outside diameter employing Carboloy tools. The lathe itself is a 200-in. gap lathe built on the general principle of a tool room lathe except for its size and the tailstock stanchion which is mounted on ways to handle gears with different shaft lengths. The locating face used in gear hobbing and shaping operations is machined from the same setup as the outside diameter on the 200-in. gap lathe. This face must indicate within 0.0003 in. in respect to the journals after machining. An electronic indicator used as a means of controlling this accuracy is shown in Fig. 7.

Multiple tooling is used also in the fabrication of the gear blank. For lightness the gear consists of a forged steel tire, forged steel shaft, forged steel hub and four steel plate webs. Webs are welded to the tire and hub at the same time, using four torches and preheating the gears to avoid setting up of stresses during welding. The openings in the webs are sealed with steel plate tubes to keep dirt out of the gear assembly. Webs are flame cut on automatic machines using two torches. Tires are rough machined prior to assembly and shafts are finish ground before being pressed into the gear hub. Fig. 8 shows a shaft being pressed into the gear hub. Note that the finished journal is protected by canvas covering.

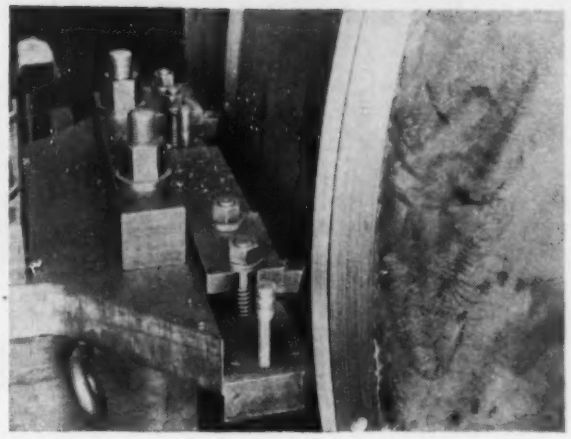

FIG. 6—Dual tooling is used on 200-in. gap lathe to machine the gear outside diameter. Tailstock is mounted on ways to handle gears of varying shaft lengths.

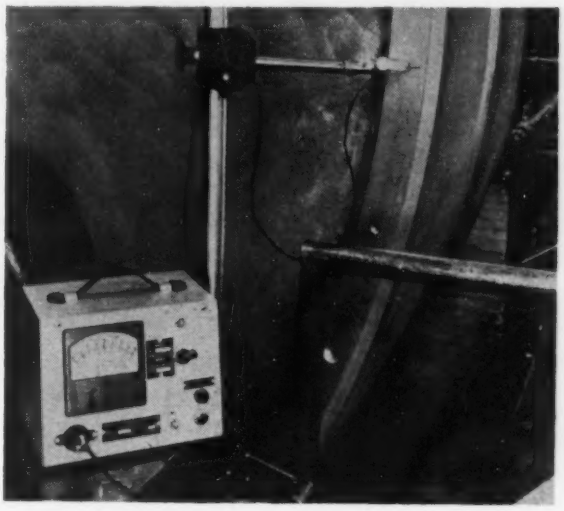

FIG. 7—The locating face must indicate within 0.0003 in. in respect to the journals after machining. The electronic indicator shown here controls accuracy.

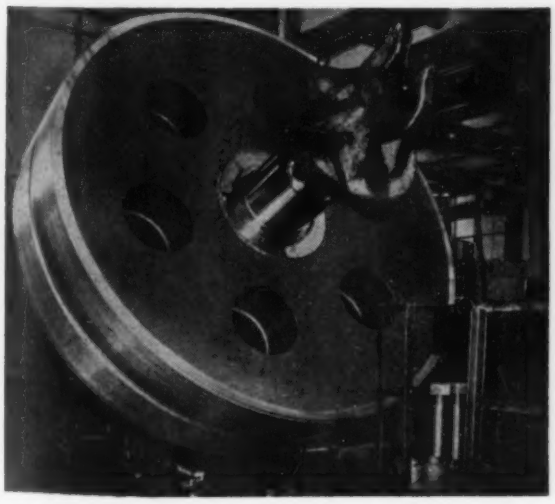

FIG. 5—Axis of the gear is transferred from horizontal to vertical position in this operation. An adapter at end of gear shaft permits crane handling.

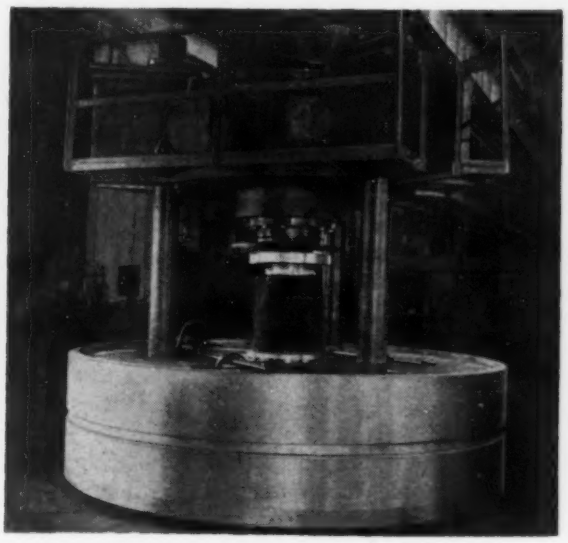

FIG. 8—Tires are rough machined prior to assembly and shafts are finish ground before being pressed into gear hub as shown in the above photo.

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Protective and nonprotective oxides—

SCALING CHARACTERISTICS Make or Break A High Temperature Metal

By D. D. Cubicciotti
Research Chemist
Atomic Energy Research Dept.
North American Aviation, Inc.
Downey, Cal.

◆ Three major types of oxidation reactions are compared . . . Tight, adherent oxide coatings are self-protective . . . Volatile, porous oxides are nonprotective . . . Different metals have different characteristics.

◆ Linear, parabolic and logarithmic oxidation curves show parabolic oxidation produces protective coatings . . . Silicon dioxide forms a glass which is the best type of protective coating.

◆ MODERN TECHNOLOGY is continually finding more applications for corrosion-resistant metals and the investigation of metal oxidations will lead to better alloys. Research on these problems is steadily increasing but much is to be learned even in the basic fundamentals of this field.

The first quantitative measurements of the kinetics of oxidation of metals at high temperatures were made in 1920.[1] One might expect a metal oxidation to have complex and nonreproducible kinetics since it is a heterogeneous reaction between solid and gas. However, it turns out that the kinetics are relatively simple because the slowest or rate-determining step is a homogeneous reaction in the solid oxide formed. Thus a large amount of meaningful data have been obtained on such reactions and their interpretation is well founded on theory.[2]

The oxide formed on the surface of the metal during the oxidation determines to a large extent the type of reaction that will occur. The oxide can be protective, tightly adherent and difficult to penetrate. After such a coating is formed, any subsequent oxidation must proceed by the slow path of diffusion through the oxide layer. Nonprotective oxides are those which either are volatile at the temperature of the oxidation or are nonadherent or porous. If the oxide is volatile, or if it is porous or flakes off, it will not protect the metal.

An important relationship exists between the densities of the oxide and metal and the type of oxide formed. If the volume of oxide formed from the oxidation of a given amount of metal is greater than the volume of metal consumed, the oxide might be protective. If the volume of oxide is less than the volume of metal used up, the oxide could not be protective.

Oxidations are classed by the form of the curve representing the amount of reaction as a function of time. The most common types are the linear, parabolic and the logarithmic oxidations. These are illustrated in Fig. 1. The linear law ($w = kt$) is found in the case of a nonprotective oxide such as with sodium, calcium, barium and similar metals. Since the oxide does not hinder the reaction, the rate is constant and the amount of reaction is linear in time. In the case of a protective oxide, the oxidation can be

logarithmic ($w = \log (kt + K)$) or parabolic ($w^2 = kt$). Logarithmic oxidations are rare but do occur with aluminum at room temperature and silicon at high temperatures. The parabolic oxidation is the most common and, in general, the most studied type. Some of the metals that oxidize parabolically are iron, copper, manganese, zirconium, titanium, nickel and beryllium in order of decreasing oxidation rate.

It is possible to show that a parabolic oxidation results when a protective oxide is formed and continued reaction must occur by diffusion through an ever increasing thickness of oxide. Referring to Fig. 2, we assume that diffusion of some species through the growing oxide layer determines the rate of the reaction. Then from Fick's Law of diffusion:

$$\frac{dw}{dt} = D\frac{\partial c}{\partial x}$$

w = weight of metal oxidized
t = time
D = diffusion constant
c = concentration of diffusing species
x = thickness of oxide layer

If one takes the concentration gradient $\frac{\partial c}{\partial x}$ as constant across the oxide layer, then

$$\frac{\partial c}{\partial x} = \frac{{}^{c}A - {}^{c}B}{x}.$$

But, w, the amount of metal that has reacted is proportional to x. Thus $w = bx$, b = proportionality constant. Proceeding from this we get

$$\frac{dw}{dt} = D\frac{({}^{c}A - {}^{c}B)b}{w}.$$

Integrating $w^2 = 2D\,({}^{c}A - {}^{c}B)\,bt + K$, or $w^2 = kt + K$. At $t = 0$, $w = 0$, so $K = 0$. Thus the parabolic law results from diffusion through the growing oxide layer.

In a logarithmic oxidation there is a very rapid initial reaction followed by a very slow one. There is no theoretical explanation of this type of oxidation law that is generally applicable. In the oxidation of silicon[3] the reaction was logarithmic in the range 1020° to 1120°C. X-ray diffraction pictures of the oxide formed indicated little or no crystalline structure and was considered a glass. If the oxide is a glass, it is possible to show that the logarithmic law should follow. Starting with Fick's Law again,

$$\frac{dw}{dt} = D\frac{\partial c}{\partial x}$$

the concentration of diffusing species to drop exponentially through the oxide layer:

$$c = c_o e^{-fx} \text{ where } f = \text{a constant}$$

Then the gradient $\frac{\partial c}{\partial x} = c_o\, fe^{-fx}$ and

$\frac{dw}{dt} = D\, c_o\, fe^{-fx} = D\, c_o\, fe^{-b\,fw}$ and integrating $w = \log (kt + K)$. So in an oxidation forming a glass one might expect a logarithmic reaction.

A study of the oxidation of germanium was undertaken because germanium dioxide can form

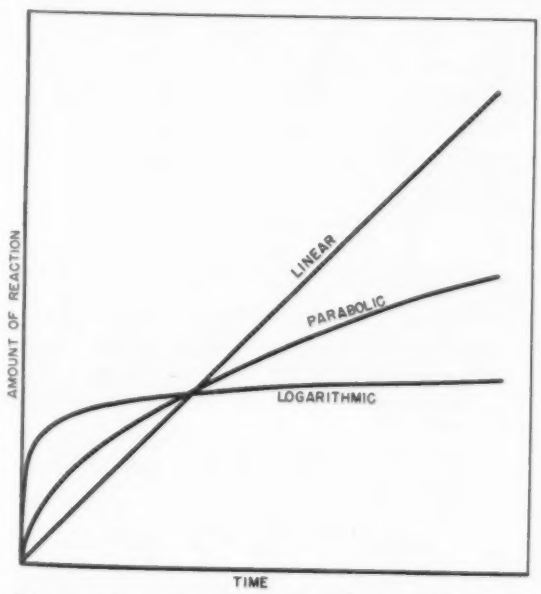

FIG. 1—Of the three types, logarithmic oxidations are rare, but are the most desirable.

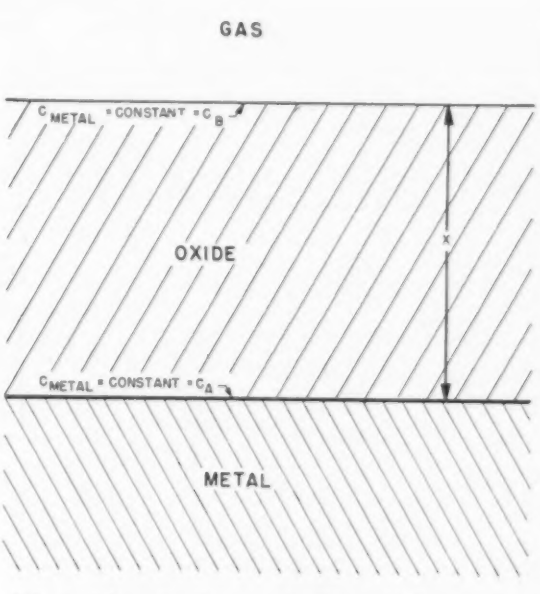

FIG. 2—Schematic diagram visualizes oxidation process. Diffusion through oxide layer sets reaction rate.

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"When the oxidation starts, a coating of germanium monoxide forms on the specimen . . ."

glasses. The results obtained, however, fit an entirely different type of oxidation law.[4] Fig. 3 shows the type of oxidation curves obtained. The numbers on the curves of Fig. 3 are the oxygen pressures in centimeters of mercury. The curves were well represented by the equation $Q = Q\infty (1\text{-}e^{-kt})$, where Q is the amount of reaction in time t, and $Q\infty$ and k are constants. The value of $Q\infty$ was very dependent on oxygen pressure, decreasing as the pressure increased. This behavior was in contrast to that of ordinary oxidations, which are essentially pressure independent. In addition, the specimens were found to lose weight and white germanium dioxide was found on the walls of the container not in contact with the specimens. Both germanium and its dioxide are involatile at the temperatures of the oxidations; however, germanium monoxide is known to be volatile.

Parabolic v. Linear Oxidation

Metal	Activation Energy in KCal Per Mol	
	Linear	Parabolic
Cerium	14	12
Uranium	22	24
Thorium	22	31

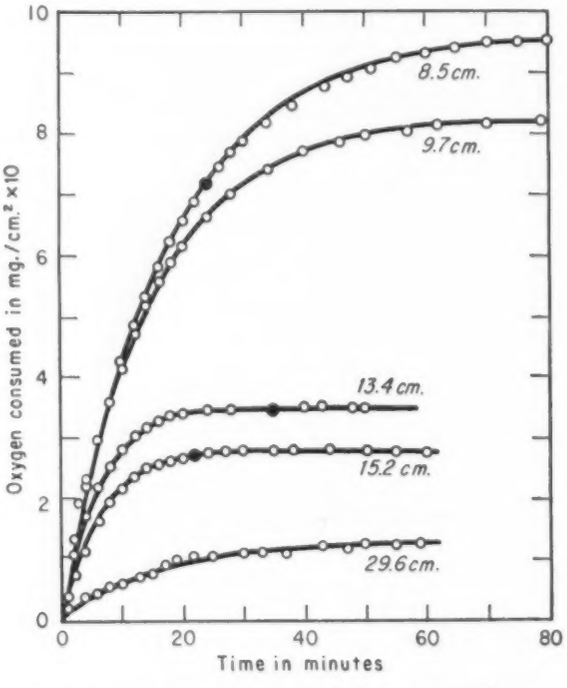

FIG. 3—Oxidation curves for germanium at 650°C are calculated from an exponential equation. The points are experimental data; the numbers represent oxygen pressures for each case.

To account for the experimental facts the following explanation was devised. When the oxidation starts, a coating of germanium monoxide forms on the specimen. Then the monoxide is gradually converted to an impenetrable layer of dioxide. While this conversion is occurring, some of the monoxide evaporates and is converted to dioxide in the gaseous state. When the specimen is completely covered by dioxide the reaction stops. These ideas can be formulated mathematically to derive the exact type of oxidation law observed.[4]

An interesting phenomenon which has been observed in several oxidations is a change of oxidation type from parabolic to linear with increase in temperature. Uranium oxidizes parabolically below 200°C and linearly above.[5] With thorium the transition is at about 350°C[6] calcium 400°C,[7] cerium 130°C,[8] and aluminum 500°C.[9]

In attempting to explain this phenomenon, the author has found no convincing reason for the transition. One possible explanation is that the heat developed during the parabolic oxidation is not dissipated rapidly enough and the temperature of the sample rises giving a resultant oxidation that appears to be linear. However, a simple calculation based on the heat balance shows that for the metals that have the transition, the temperature is less likely to rise than for metals that do not have the transition, like copper, iron, manganese and zirconium. The temperature increase explanation, therefore, does not seem very plausible.

An alternate explanation may be offered. If the oxide were porous or nonadherent above a certain temperature and not below, a transition to a linear oxidation would occur at that temperature because the density of the metal increases with temperature more than that of the oxide, and at a certain temperature the metal to oxide volume ratio becomes greater than unity.

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[2] See: "The Corrosion Handbook" edited by H. Uhlig, John Wiley and Sons, New York, N. Y., 1948—for a discussion of the theory and results in this field.

[3] Brodsky, M., and D. Cubicciotti, J. Am. Chem. Soc., 73, 3497, 1951.

[4] Bernstein R., and D. Cubicciotti, J. Am. Chem. Soc., 73, 4112, 1951.

[5] Cubicciotti, D., J. Am. Chem. Soc., 74, 1079, 1952.

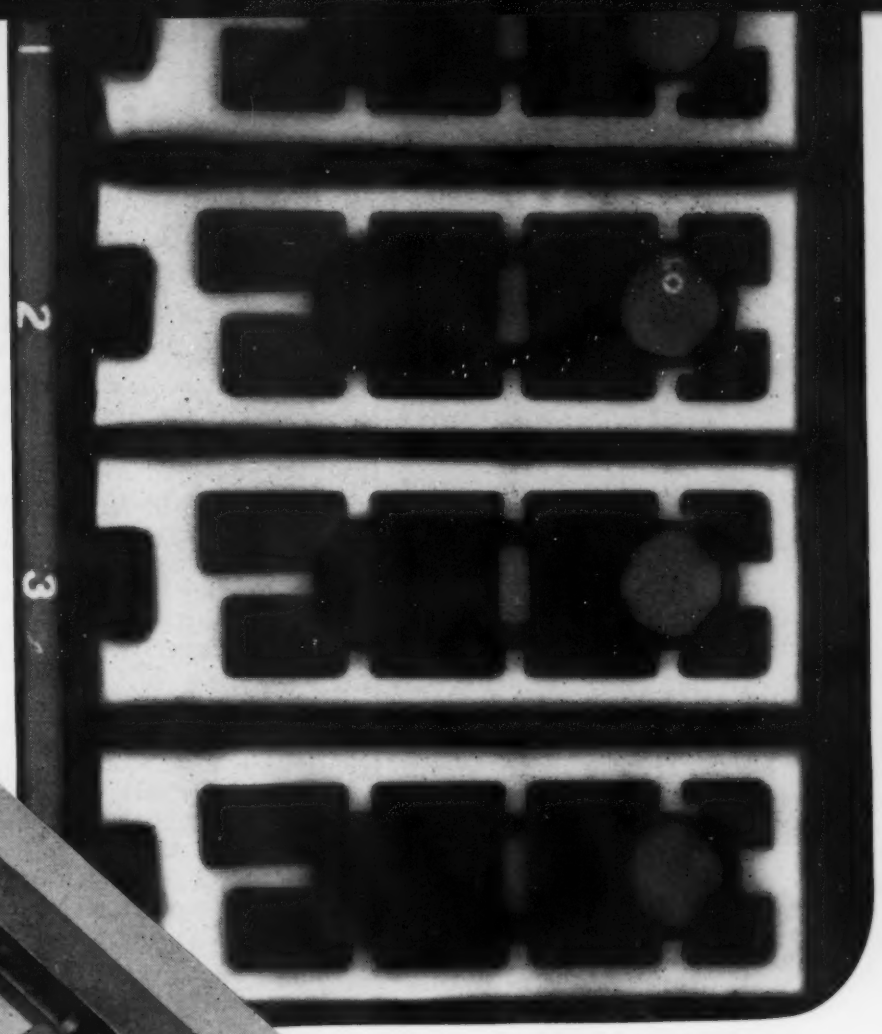
[6] Levesque, P., and D. Cubicciotti, J. Am. Chem. Soc., 73, 2028, 1951.

[7] Cubicciotti, D., J. Am. Chem. Soc., 74, 557, 1952.

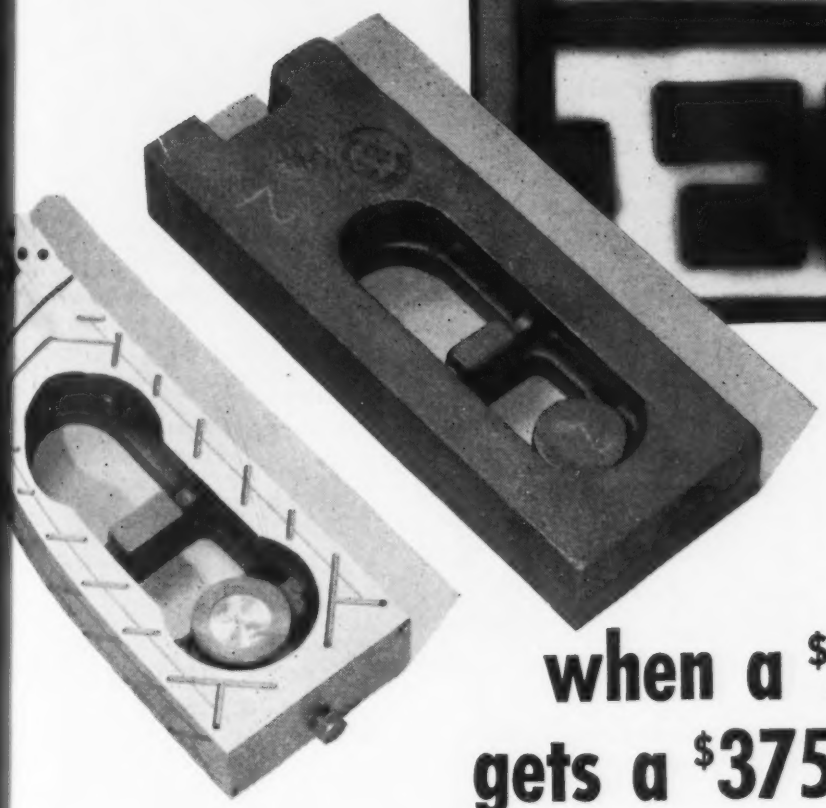
[8] Cubicciotti, D. J. Am. Chem Soc. 74, 1200, 1952.

[9] Gulbransen, E., and W. Wysong, J. Phys. and Colloid Chem., 51, 1087, 1947.

ADIOGRAPHY prevents waste



Radiograph of an iron casting for a reciprocating ram.



when a $2 casting gets a $375 treatment

This is a casting for a reciprocating ram. It is to be machined and hand scraped to a final flatness of less than .0001 inch. Should porosity show up during machining, the cost of work done and heat treatment is wasted. The part must be scrapped, not scraped.

But radiography avoids that. By x-raying every casting, flaws are discovered before work is started . . . before hundreds of dollars have been invested in machining and heat-treating costs.

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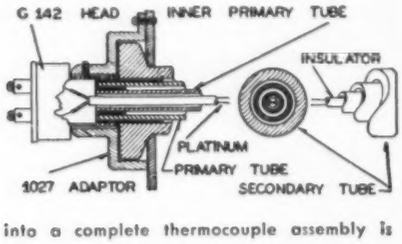

into a complete thermocouple assembly is light in weight and permits easy replacement of new elements into a protecting tube assembly.

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Technical Briefs

FOUNDRY:

Continued wide interest in shell molding shown at AFS meeting.

Shell molding is emerging from the strictly experimental stages, as evidenced by the many papers devoted to various phases of the subject at the American Foundry Assn's Chicago meeting last week.

Many foundrymen are exploring specific problems including sands, resins, testing methods, testing standards, pattern problems, and difficulties encountered in pouring various metals.

Materials Testing

While the job foundryman still has doubts concerning the economic applications of shell molds, the technical aspects are moving ahead rapidly.

Indicative was the report by G. A. Conger, Cambria Foundry & Engineering Div., Stevens Mfg. Co., Ebensburg, Pa., on the first meeting of the Shell Molding Material Testing Committee May 4, at the 1952 AFS convention at Atlantic City. The committee program includes: (1) A reference sand; (2) cured strength, hot and cold; (3) mixing procedure; (4) cured permeability; (5) cured deflection, hot and cold; (6) sample preparation; and (7) hardness. Tentative standards for tensile evaluation are scheduled for publication in late spring this year. The reference sand is already available.

STAINLESS STEEL valves and fittings are poured in shell molds at Cooper Alloy Foundry Co. of Hillside, N. J. Here, matched shells, with cores, are bonded together with an adhesive tape. Matching points insure against shifting of shells.

METAL is poured in shell molds at Cooper Alloy without using backup for shells.

Fewer Mismatches

Aluminum and cast iron are the most common materials for shell molding patterns, Mr. Ray Olson, of Production Foundry & Pattern Co., Chicopee, Mass., reported. Generally, the material must stand repeated heating to about 600°F.

Pattern or patterns are arranged on plates so that cope and drag match with locators established on the plate surface. The locators create a corresponding condition on the joint face of the two halves of the completed shell mold.

Cut Thread Corrosion

Aluminum can be processed at a reasonable cost, and a well cared for aluminum pattern will produce 5000 or more shells. Aluminum plaster cast plates are particularly adapted to irregular partings at the joint of the two shell mold halves.

In some cases aluminum patterns can be replaced as often as three times without exceeding the initial cost of cast iron patterns. Often, master patterns are machined alu-

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inum which permits working to oser tolerances.

In the use of aluminum patterns owever, care must be used in stening screws or bolts in con- ecting the pattern with the base ate, since repeated heating and oling can loosen the bolts. Coating e screws with a high temperature bricant is a good idea, and will ecrease heat-caused thread corro- ion.

Brass and bronze, or steel pat- erns, have also been used. Machined teel patterns have been used com- nercially with considerable success or production runs of small parts.

For long wearing iron patterns hat will take a high finish, an nalysis of 3.10 pct C, 1.90 Si, 0.80 Mn, 0.10 S and 0.10 P has been ood. This iron can be annealed at 1500° for 1-hr for machinability. Stress-relieved iron plates, ground to ½ in. thickness have produced excellent results.

Handle With Care

In some cases a wood master pattern has been used with metal shrinkage or machining allowance included. From this an aluminum master pattern is made. The master is mounted on a plate, and from this pattern shell molds are pro- duced. Shells are poured with the required pattern material, and the resultant castings are used as a pattern.

Aluminum patterns are easily nicked, often when a shell sticks to the pattern and a shop mechanic uses a screwdriver to pry the shell from the pattern. Patterns should be stored carefully, upright and attached to the base plate.

Steps In Patternmaking

O. C. Bueg, Arrow Pattern & Engineering Co., Erie, Pa., divided shell mold pattern making into nine steps. First step is to determine whether or not the part can be produced more cheaply by the shell molding process. Assuming shell molding is economic, the proper alloy for the pattern must then be determined. Aluminum has advan- tages.

Pressure cast plates are suitable

Turn Page

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if precautions are taken in co
struction of the master partin
Where flat partings are use
machined-and-mounted patterns a
recommended since often only o
plate is necessary to produce t
shell. For long production run
cast iron offers greater patte
hardness. The cast iron pattern al
has a better heat transfer valu
and seems more adaptable to sil
cone release sprays.

High Surface Finish

Thermal expansion should be co
sidered. Pattern surfaces should b
finished to a high polish. Therma
expansion should be considere
when bolting a pattern to an allo
back plate.

Shell mold gates and riser
should generally be smaller tha
those needed in green sand casting
This is particularly important i
vertical pouring.

Gates and Risers

Sand-resin retaining strips on
the shell mold pattern plates were
also suggested. Strips should b
tapered for ease in ejecting the
completed shell. Strips prevent the
uncured shell from falling away
from the pattern plate when the
pattern is inverted to receive the
sand-resin mix. For high tempera-
ture use at high speeds, the pattern
and base plate should be of identical
alloys.

Gates on patterns should be sep-
arate since several gating changes
may be tried before the best pattern
is found.

Casting Magnesium

Casting of magnesium alloys in
shell molds was described by
Nicholas Sheptak, Dow Chemical
Co. Because of the reactivity of
magnesium alloys in the molten
state with silica sand, inhibitors
were studied. Conventional green
sand casting of magnesium may
employ boric acid, sulfur, glycol,
and sometimes a flushing of the
mold cavity with sulfur dioxide gas.

The sulfur dioxide flush did not
seem particularly effective. Boric
acid additions to the sand-resin mix
as an inhibitor had a weakening
effect on the shell strength.

N SHELL MOLDS:

rocess uses oil and sand mixture, teur drier.

rk horse at the American dry Assn's meeting in Chicago eek was the D-Process. Using place of resin, Dietert Foun- o., Detroit, and Archer Daniels nd Co., of Minneapolis, have oped a new process which may strong competition to shell ing. The lower cost of oil er as compared with resins is incipal factor in development e D-Process. While no papers scheduled on the topic, cor- sessions covered the subject oughly.

process, originating with the ert Foundry Co., Detroit, and ing an oil binder prepared by Archer Daniels Midland Co., inates the use of a shell mold- machine, yet produces what is d a shell mold.

se Conventional Equipment

onventional foundry equipment sed to blow the sand-oil mix a "countour-drier". The mold t be cured for upwards of half hour, but is reported to give d mold strength and to be able for large shell mold appli- ons.

irst requisite is a fine, dry core d. Preliminary work indicates either a bank sand or a washed dried Ottawa-type sand may be loyed. From 1 to 3 pct by weight a special oleoresinous binder is ed to perfectly dry sand.

Contoured Drier

The amount of binder depends n the type and fineness of dry d used. Other sand additives y be incorporated in the mixture elevated temperature proper- ; however, the fundamental for- la of sand and oil cited above be used by itself.

After blending binder and sand regular equipment, the mixture placed in the hopper of a con- tional blow machine and the ell mold is blown on a contoured er. This drier differs from the ular drier in that it is used to m the back of the shell mold as ll as act as support for the mold

Turn Page

Rolling with the Punches..

Drum segment assembly, 17½" dia. x 46" long—rough, sandy steel forging. Note the many interrupting cavities on the surface that give the tool its bumps.

On the jump cut job illustrated, a Kennametal clamped-tool is a 6 to 1 favorite over a HSS tool . . . takes thousands of bruising blows on its nose without breaking down; cuts miles of forged, sandy steel without wearing out.

Here are the comparative performances:

HSS tools took 12 hours to complete 2 cuts, and were reground 4 to 8 times. Kennametal tool Style BRH32, Grade K2S, operating at 6 times the speed, does the same work in 2 hours. Its clamped-on tip requires only 2 regrinds.

Great strength and ruggedness are required in a cutting tool, to enable a lathe to keep rolling on interrupted cutting. These qualities, inherent in Kennametal tools, are equally valuable for light, continuous cutting jobs. Ask our Field Engineers to demonstrate. Kennametal Inc., Latrobe, Pa.

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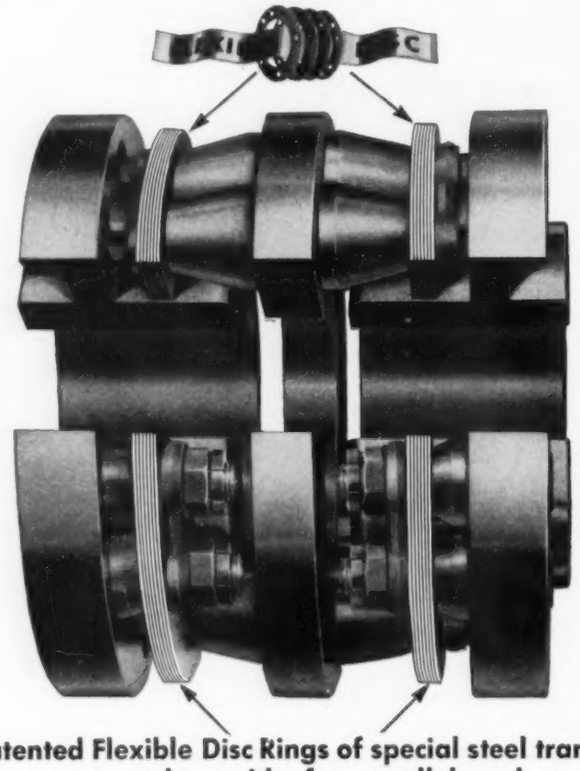
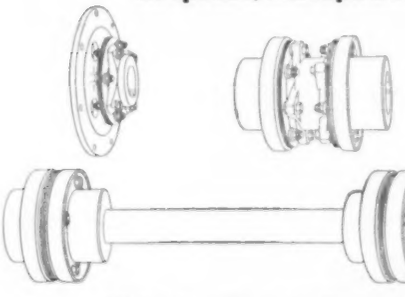
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes.



THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

MANUFACTURERS OF FLEXIBLE COUPLINGS ONLY FOR OVER 35 YEARS

Write for our new Engineering Catalog No. 51

THOMAS FLEXIBLE COUPLING COMPANY

WARREN, PENNSYLVANIA, U.S.A.

itself. The drier is vented so th the sand can be adequately pack in it.

No Backing Needed

Normal blow machine pressur are used and no other special equi ment is necessary. The blown sh mold and drier are placed in conventional core-baking oven f curing. Time of curing is a fun tion of the mass of sand in th core, its thickness, the type an grain-size of the sand, the amoun of binder used, the weight an composition of the drier, and th load in the oven.

Temperatures as high as 600° may be used if the time cycle i adequately short. A half-inch she baked on a drier about 1-in. thic should be thoroughly cured in abou 40 minutes at 550°F when 2½ pe binder is used with fine, dry bank sand.

Shells are clamped together an founded. No special backing mate rial is necessary since the thickne of the shell can be so adjusted t prevent the breaking through o the shell by the molten metal.

Procedure for Test

The following procedure may b used for testing the process:

Place 975 lbs of dry bank sand into a cleaned muller.

Run the muller a few seconds to distribute this fine sand over the base plate.

Slowly add 25 lb of liquid binder to the sand.

Mix the binder with sand for a sufficient time to assure complete dispersal. No more than 10 min should be necessary.

Clean Pattern Surfaces

Discharge the sand from the mixer and place it in the reservoir of the cleaned blow machine.

Place drier plate on machine table and blow shell molds. Pattern surfaces must be properly cleaned with a solvent such as gasoline.

Remove the shell mold and drier from the machine and bake the mold in the drier.

Some Precautions

Here are a few precautions to observe:

The muller should be as clean as

Turn to Page 154

just the right VERTICAL drive for every job!

On agitator tanks—on mixing vats—on overhead conveyors—on beaters—wherever the application calls for a vertical drive, you will find just the right one for your needs in the wide range of drives available from Foote Bros. Capacities up to 264 h.p. Ratios from 4⅛ to 1 up to 4118 to 1.

Line-O-Power Drives—compact, efficient drives with Duti-Rated Gears available in standard models or in extended shaft design where long unsupported output shafts are encountered.

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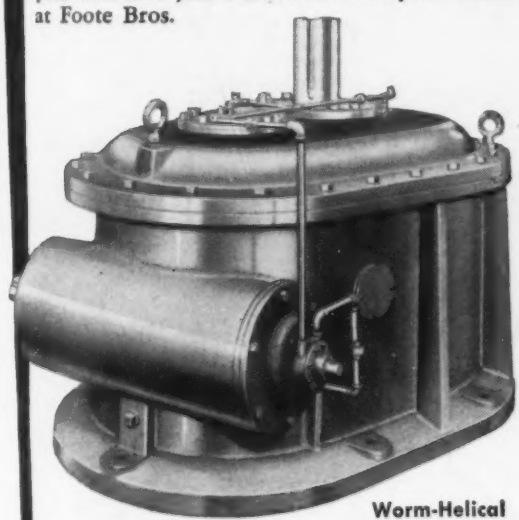
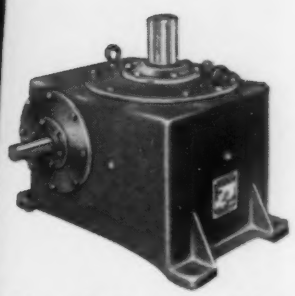


Worm-Helical Gear Drive

Foote Bros.-Louis Allis Gearmotor Extended Shaft



Hygrade Worm Gear Drive Standard Shaft

Hygrade Worm Gear Drive Extended Shaft

Line-O-Power Drive Standard Shaft

Line-O-Power Drive Extended Shaft

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- ☐ Foote Bros.-Louis Allis Gearmotors
- ☐ Hygrade Drives
- ☐ Worm-Helical Gear Drives

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Die Steels—Hot Work and Shock Resisting Steels
Carbon Tool Steels.

TOOL COLUMBIA STEELS

possible, before and after discharge of mixed sand. Binder which clings to sides of the muller must be mixed into the sand.

Mixed sand can be stored in an open area without protection for approximately 24 hr. If longer storage time is necessary, a cloth dampened with fuel oil (not water) can be used as a covering.

Blow machine lines must be free from water for best results.

Shell molds should be blown in as rapid succession as possible to prevent oxidation of the thin film of binder on the pattern surfaces.

Control of Shell Thickness

Advantages of the D-Process compared to regular shell molding are said to include:

Thickness of a D-Process shell can be controlled by the contour of the drier, lessening danger of horizontal section breakthroughs when the shell is founded in a vertical position. Sand reinforcing ribs can be made integral with the back of the shell.

No special foundry equipment is needed other than contoured driers.

STEELMAKING:

Television in hot strip mill helps avoid pileups.

Television is the newest production wrinkle at United States Steel Corp.'s Gary Sheet and Tin Mill where a camera, monitor and receiver have been installed on the 80-in. hot strip mill. This mill holds the world's record for production of hot-rolled steel strip.

The TV installations, made by the Illinois Bell Telephone Co., enable the mill operator to keep watch and check the condition of the fiery red steel strip as it leaves the last finishing stand and speeds 395 ft to the coilers. The extra eyes of TV help the operator to spot potential trouble and take corrective action before the strip is coiled.

Gives Overall View

The camera is mounted 48 ft above the run-out table leading to the coilers. It commands an overall view of the strip from the finish-

FOR THE VERY BEST
See ATLAS

TRANSFERS - SCALE CARS
COAL CHARGERS - COKE QUENCHERS

50-TON GABLE BOTTOM ORE TRANSFER

Car is equipped with hydraulically operated discharge gates and brakes, and is provided with steel plate trucks. The operator's cab is overhung at one side to give the operator a line of vision alongside the car. The car is equipped with electric space heaters.

ENGINEERS AND MANUFACTURERS
THE ATLAS CAR & MFG. CO.
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ng stand to coiler. A monitor with a 10-in. screen is mounted on the north wall of the mill opposite the No. 1 coiler. It is used for adjustment only.

The TV set, comparable to the home type, is mounted on the control pulpit adjacent to the No. 10 finishing stand. The operator can ignore a series of water-sprays which obscures his view of the steel strip. His TV receiver has a 10-in. screen and 525 horizontal lines.

Lights, Camera, Action

To provide sufficient light for the television camera, the mill is lighted up like a Hollywood studio. Engineers have installed a bank of 44 500-w spotlights on 4-ft centers directly above the run-out table on which the steel strip travels to the coilers.

Chief advantage of television is the opportunity it affords to spot potential trouble, such as cobbles and pile ups, in time to make necessary corrections. In this way it will minimize costly delays. One cobble may mean as much as 15 min lost production time, or approximately 120 tons of steel.

TELEVISION CAMERA mounted on rafters above run-out table at United States Steel Corp's. Gary sheet and tin mill records progress of hot strip as it moves from finishing stand to coilers.

Turn Page

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RESEARCH:

More sensitive corrosion measurements possible with NBS procedure.

More sensitive measurements of corrosion on a wide variety of materials is possible with an interferometer procedure developed by the National Bureau of Standards.

In recent studies the corrosion resistance of such varied materials as optical glass, porcelain enamel, quartz and other natural and artificial silicates, and various metals were studied. The method is believed to have value for comparing and predicting the chemical durability of various materials.

Although interferometers have been widely used in science and industry for checking accuracy of block gages, measuring expansion and checking optical "flats," they have apparently been used very little in previous studies of corrosion resistance. With this highly sensitive method, corrosion to a depth of as little as 1 or 2 ten-millionths of an inch can be detected on optically flat specimens.

Interference Fringes

In the NBS technique, specimens are ground and polished to optical flatness and then immersed to half their depth in the desired corrosive solution.

After the desired time they are withdrawn, rinsed and dried, and covered with an optically flat piece of quartz. Using a conventional viewing apparatus with an unfiltered helium lamp for illumination, displacement of the optical interference fringes at the level-of-solution line of the specimen is observed.

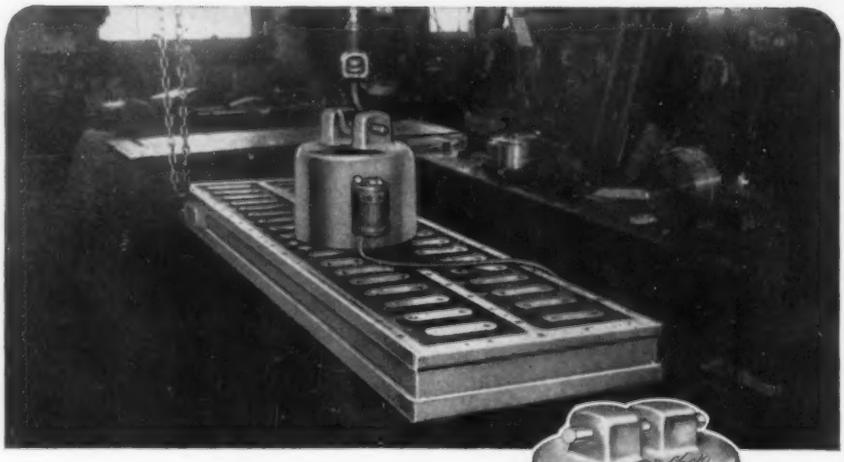
These interference fringes appear as vertical parallel lines. If the uniform flatness of the specimen under study has not been impaired by the corrosive solution, these fringes are straight and continuous. However, if the specimen surface has been sensibly attacked, each of the vertical fringes is shifted laterally at the point where it crosses the change-of-thickness line. If as sometimes happens the solution has caused swelling of the specimen, the lateral shift is in the opposite direction.

Lateral Shift

A lateral shift equal to the space between two adjacent fringes corresponds to a dimensional change in the specimen amounting to one-half wavelength of light, or roughly 0.3 micron. With careful use of the interferometer, changes in specimen thickness of as little as 0.003 micron can be detected.

Silicates studied by this procedure at NBS were quartz, fused silica, opal, obsidian, flint, and pitchstone. Porcelain enamels studied were acid-resistant, class A; "glass-lined" tank; and acid-

Walker Does It Again-



Pound for pound, volume for volume, this is the strongest magnet made

WALKER MAGNETS—The utilization of magnetic force under the most efficient conditions is the outcome of Walker's more than fifty years of research and development. . . . The 12" diameter Walker lifting magnet shown holds work up to 3000 pounds.

The Walker material is high in permeability and magnetized to complete saturation with equal flux distribution. . . . The Walker line includes contoured lifting magnets increasing the area of contact for special applications (for wire, pipe, etc.)

Original Designers and Builders of Magnetic Chucks

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esistant, class D. Metals were old-rolled steel, aluminum, cop-er, brass, silver, and platinum.

Corrosive agents ranged from oncentrated sulfuric acid (H_2SO_4) to 5-pct sodium hydrox-de (NaOH) solution. Exposure imes were as short as one minute nd as long as several weeks. Tem-perature in most cases was held at 0°C.

Metal Reactions

Although brass was attacked by trongly acid and strongly alka-line solutions, there was a slight ndication of swelling in the more nearly neutral solutions. Such ap-parent swelling could perhaps be caused by the formation of a layer of insoluble salt having greater volume than the metal from which it was formed.

Of the metals studied, only plat-inum showed no detectable dimen-sional change under the labora-tory conditions. The three types of porcelain enamels studied va-ried widely in their chemical in-ertness as indicated by the test.

PORCELAIN ENAMEL:

Life of thermocouple protective tubes extended.

Life of tubes used to protect thermocouples used in the manufac-ture of aluminum has been raised to an average of 450 to 500 hr through use of porcelain enamel. Result has been a cut in equipment replacement costs.

Uncoated tubes used by the Rey-nolds Metals Co. formerly lasted about 160 hr. Failure of the pro-tective tube caused failure of the thermocouples.

Cast Iron Base

Reynolds took its problem to Barrows Porcelain Enamel Co., Cin-cinnati. The tubes are made of cast iron from the bottom to the hot metal line and plain iron above this line. The cast iron provides the base for the porcelain enamel coat-ing.

In determining the best coating that would extend the life of the protective tubes yet would result in substantial cost savings, some 23 different coatings of various formu-lations were tried. Barrows No. 5 coating has proven to be the best.

Turn Page

THERMOCOUPLES used in production of aluminum last longer when protective tubes have been porcelain enameled.

A better Lathe
from any angle.
(1) "Zero Precision" Tapered Roller Bearings—the best Timkens on any lathe. (2) Large collet capacity with Choice of Center Distance. (3) Hobcut gears throughout for smooth operation. (4) Modern full double wall apron. (5) Bed has an engineered backbone. (6) Two V-belts to spindle for greater pulling power. (7) Holds precise accuracy for years.

By whatever standards you measure a lathe—bearings[1], capacity[2], gearing[3], apron[4], bed[5], power to spindle[6], accuracy[7]—whatever is important to *you*, you will find it completely satisfied in a SHELDON lathe.

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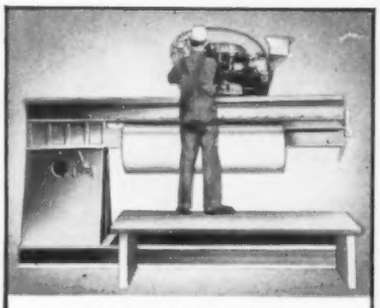
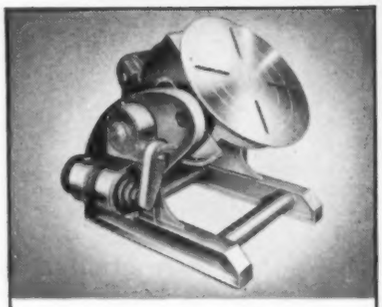
TURNING ROLLS
AUTOMATIC WELDING FIXTURES



HORN TYPE WELDING JIGS

★ In 6 models; capacities up to 9 ft. x 3/8 inch
★ In 2 styles for light or heavy shells
★ Water-cooled copper weld backing bars
★ Positive, rigid, toggle-action clamping
★ Track for any automatic welding head



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Technical Briefs

MACHINING:

Indexing tungsten carbide inserts cuts costs of machining wheels.

Improved overall finish, virtual elimination of scrap, and substantially increased production with decreased tool costs have been gained by a prominent Western Pennsylvania steel company through use of tungsten carbide tooling on wheel boring lathes.

Operators rough bore 6-in. diam wheel holes in 36-in. diam forged steel car wheels with a special step boring head having four 1-in. diam carbide inserts of Kennametal Grade K4H. These are positioned so that each cuts a proportionate amount of the total stock to be removed.

Less Regrinding Needed

Inserts are fastened to the boring head with socket head cap screws which permit indexing to a new cutting edge a number of times before any regrinding is necessar

Despite runout of the 6-in. dia rough pierced hole, each wheel bored in one pass on a 75 hp Snyd car wheel boring unit at 320 sf and 0.044-in. feed-removing abo 1-in. of stock from the bore dia eter.

About 25 wheels are bored befo the inserts are rotated to a ne cutting position. Since eight ne cutting edges are available, 200 c wheels are bored before the inser require any regrinding.

Machined in 6 Minutes

Similar tungsten carbide tooling inserts 1¼ in. in diam, produce by Kennametal Inc. of Latrobe, Pa is also being used on a new Bullard wheel lathe.

This permits turning of both flange and tread and facing the outside of both rim and hub on "one wear" (Bhn 250) wheels in 6 min floor-to-floor time.

The same operation on "multiple wear" (Bhn 325) wheels is done in

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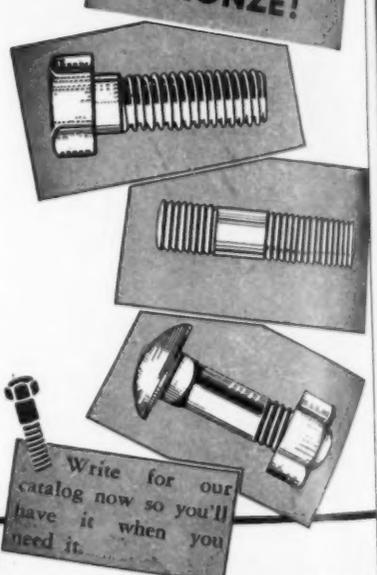
ALUMINUM BRASS AND BRONZE!

When high standards dictate the fastening of aluminum with aluminum, JAQUES nuts, bolts, screws, etc., are the answer. Cold-headed and heat-treated, JAQUES aluminum fasteners are light, strong, and durable.

All non-ferrous metals and alloys, incuding naval brass, silicon bronze and monel, can be furnished in standard and special parts.



Write for our catalog now so you'll have it when you need it.

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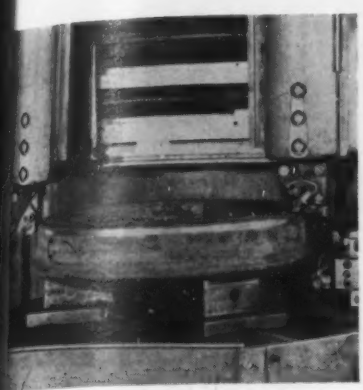
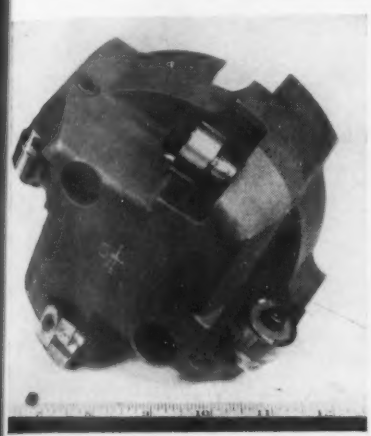


NEW BULLARD wheel lathe is used in machining 36-in. car wheels. Tracer attachment makes machining operation automatic.



STEP BORING HEAD has four tungsten carbide 1-in. round button inserts. Stock removal from car wheels is about ½ in. in rough boring operation.

11 min. The Bullard is equipped with a tracer attachment making the machining operation fully automatic.

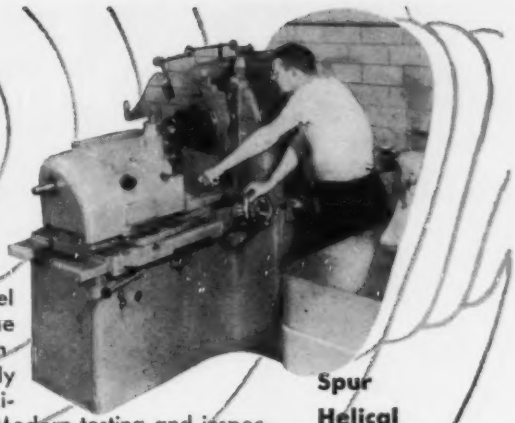
Revolutions per minute and surface feet per minute for "one wear" wheels is 27 and 254 maximum respectively; on "multiple wear" wheels it's 18 and 161 maximum respectively.

Guided By Tracer

Two Kennamatic inserts in the contouring-head tool machine the flange as they are guided around the form by a tracer finger following a template.

Approximately 50 wheels can be machined before it is necessary to rotate the inserts to new cutting positions. Six cutting edges are available before any regrinding is necessary, number of wheels machined per grind amounts to approximately 300.

ears for gears



Because minimum noise level is so important in some applications, we will—whenever required—individually *sound check* gears for maximum silence in operation. Modern testing and inspection equipment—such as that illustrated—is available to electronically check gears for exacting noise limits, under a specified load and RPM. Through such thorough inspection quiet operation is assured.

The next time you have a special gear need, let *quiet* gears help reduce unnecessary noise—specify The Cincinnati Gear Company. Write, wire or call for full information.

Spur
Helical
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***Coniflex Bevel**
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beyond compare!

This close-up of Hendrick Perforated Metal Plate shows no ordinary screen. No other screening medium can equal it for uniformity of mesh, for non-binding clearance and for unparalleled long service life.

Flat or corrugated Hendrick Perforated Metal is available in any desired shape and size of perforations in high carbon steel and other commercially rolled metals. Decks can be changed fast and efficiently—cutting time and labor costs. For more details write for information.

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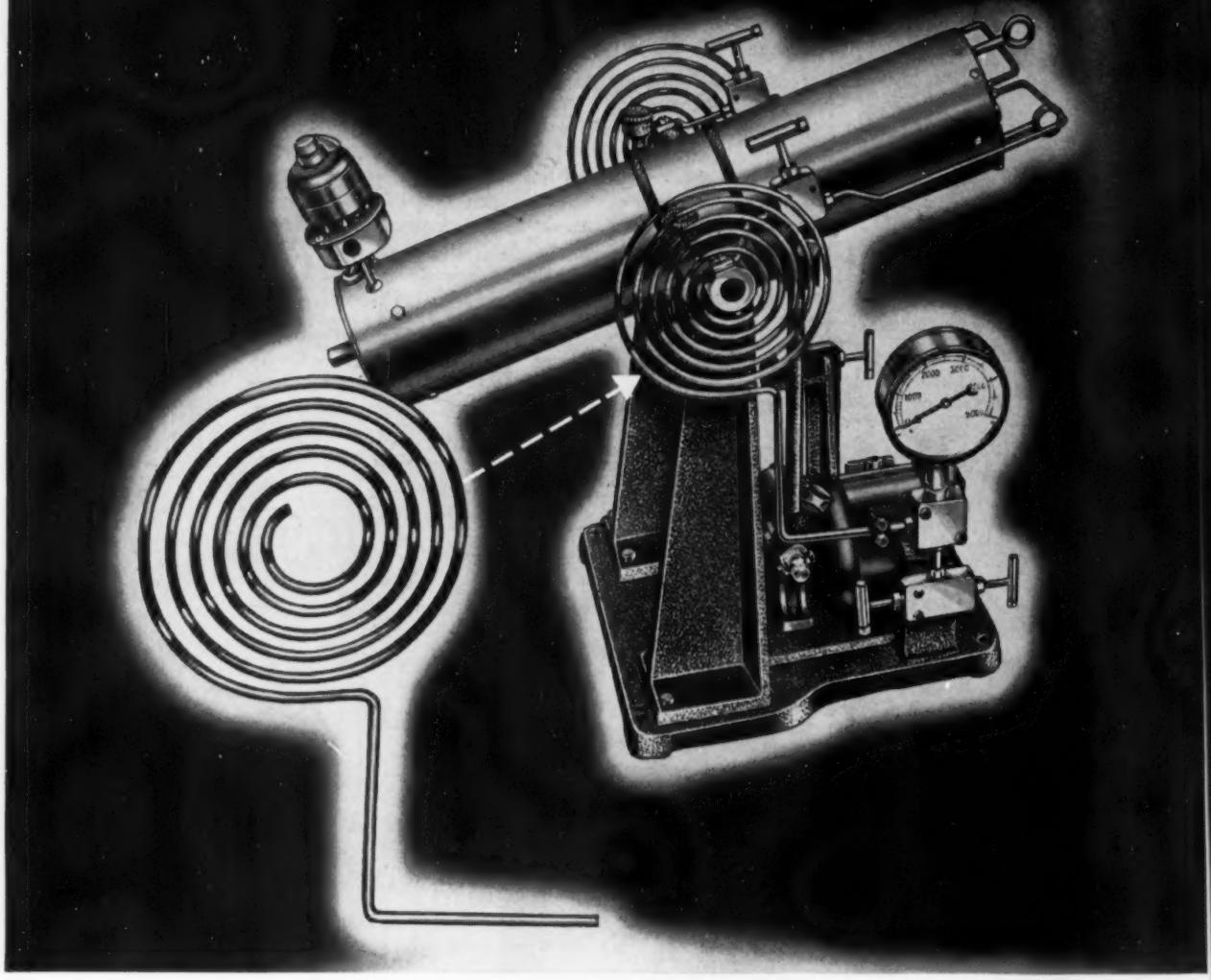
Windpipe for a peaceful H-bomb



You can call it an H-bomb if you like. Some people do. Technically, it *is* a hydrogenation bomb or, simply, a super-pressure vessel. Uses for it are legion but not warlike.

Researchers in rubber, plastics, pharmaceuticals, petroleum, and solvents pilot their hydrogenation, oxo-reaction, polymerization and other jaw-breaker problems in its gizzard—under high pressure.

To speed-up chemical reactions, the vessel is rocked 38 times a minute. Pressurizing a see-sawing chamber is in itself a neat trick: when pressures of the order of 60,000 p.s.i. are required you might become discouraged or concerned.

American Instrument Company, Inc., maker of Super-pressure equipment, introduces the pressure through a spiral windpipe. They had some trouble through tube breakage but that was before they tried Superior 304 Cold-drawn Seamless Stainless Steel Tubing. Superior gives them just the flexibility and fatigue strength needed for cyclic operation, plus chemical resistance and burst pressure to spare. Spirals of Superior 304 are easier to bend, last longer. And American Instrument reports them dimensionally uniform, smooth and free from surface imperfections.

If you haven't found small tubing in the analysis, size, and finish you want, or if you think there's little difference in tubing or tubing experience, Superior invites your inquiry. Superior Tube Company, 2004 Germantown Avenue, Norristown, Pennsylvania.

Round and Shaped Tubing available in Carbon, Alloy, and Stainless Steels; Nickel and Nickel Alloys; Titanium, Zirconium, and Beryllium Copper

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The Iron Age
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Markets & Prices

Will Make More Than 110 Million Tons of Steel

Provided the industry is able to clear the wage hurdle without a strike . . . Demand continues to outpace forecasts . . . Wage talks recessed for study . . . Operations hold.

The steel industry will undoubtedly set a new production record this year—if it can get past the wage hurdle without a strike. So far this year production has averaged just about 100 pct of rated capacity. On an annual basis this rate would yield about 117.5 million net tons of raw steel.

Few expect the industry will be called upon to operate at capacity throughout the year, although balance between supply and demand seems as elusive as a butterfly. Those who forecast an early balance this year have repeatedly had to raise their sights. It's becoming something of a joke to say they'll eventually be right, but it's still true.

Set New Record? . . . Right now it seems a good bet that the industry will produce well over 110 million tons of steel this year. Previous high was 1951, when steel companies poured 105.1 million net tons of ingots and steel for castings. Last year the industry produced 93.2 million tons, with a loss of more than 19 million tons during the 54 day strike.

Prediction of well over 110 million tons of steel production this year is based on assumptions that the industry will be able to avoid a strike, and that raw materials will remain in as good supply as they are now. It also reflects belief that demand will still be at high level during the third quarter and that the market won't come apart at the seams (though it will probably decline moderately) in the fourth quarter.

Filled As Opened . . . On paper at least, third quarter steel business is already in the bag. Order books on most products have filled almost as fast as steel firms opened them for business.

Steel producers historically take a conservative view of their order books. Some of them have learned the hard way that bona fide orders are frequently cancelled once the word gets around that steel can be delivered on short notice. That's one of the reasons most mills screen their orders carefully in an effort to make sure they are based on real needs.

Just In Case . . . Regardless of what happens later this year, current steel demand is as strong as it has been for many months. It's no secret that some consumers are pressing hard for delivery before the wage contract expires June 30. They don't expect a strike, but they want to be prepared—just in case.

Consumer pressure for steel was already strong before the wage question entered the limelight. And, with few exceptions, manufacturing schedules are holding their own, if not increasing.

Scream for Sheet, Strip . . . Demand for flat-rolled products is fantastic. Slight production cutbacks by some appliance people have been more than offset by fresh cries for sheets and strip from other users.

The hottest and most spectacular market centers around Detroit where automakers are pulling out all stops in a great production battle. None of the Big Three has been able to obtain promises of as much steel as it thinks it will need in the second half. At least one of these paceseiters plans to boost production in the third quarter.

Bars Stay Hot . . . Demand for bars is no less intense. Hot-rolled bars are fully as tight as sheets. Stepped-up demands for shell steel are being felt in this market. Demand for cold-finished bars varies with size. Under 1-in. in diam they are easy. Over that they become tight, with tightness increasing with size.

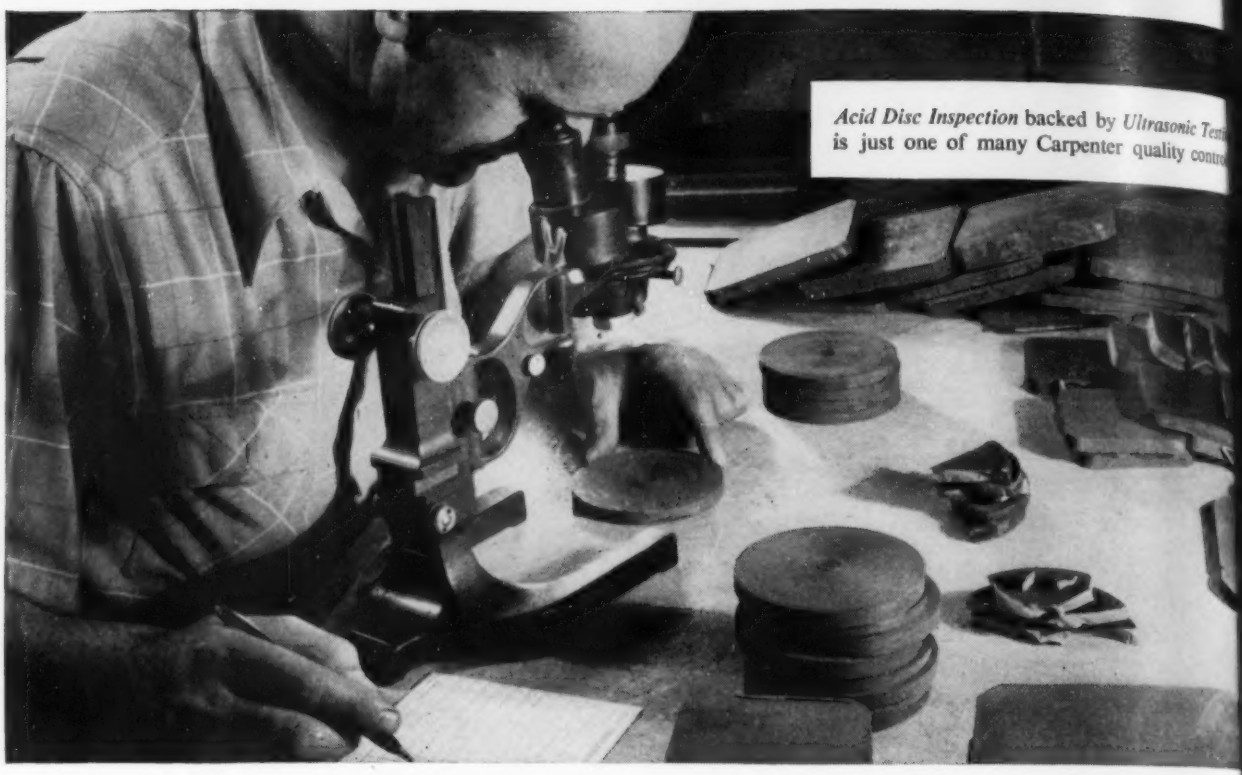
As had been predicted by THE IRON AGE, most steel producers have now raised extra charges on nearly all major steel products. Although steel consumers could not be expected to applaud these cost increases, there have not been many squawks. Manufacturers contacted by THE IRON AGE in several steel using areas generally indicated they would pass the higher costs on to the consumer.

No Early Action . . . There will be no early shift in steel buying patterns as a result of revisions in extra charges. In most mass production manufacturing buying patterns will likely remain static because of the repetitive nature of operation. Other consumers reported they were continuing to study the extra changes, but they generally doubted it would be worthwhile to attempt to switch their buying to different steel products.

Steel wage talks were recessed while transcripts of the union's verbal pitch for a wage increase were being made for study by steel officials. A "moderate" (about 10¢ an hr) wage increase is expected, followed by a steel base price increase of perhaps $4 a ton.

Steelmaking operations this week are scheduled at 100.5 pct of rated capacity, down half a point from the previous week.

UNIVERSITY OF MICHIGAN LIBRARIES



IF YOU USE TOOL STEEL, THESE ARE FACTS YOU SHOULD KNOW

When you make or use a tool or die you invest a sizable sum of money. And there are steps you normally take to protect your investment. You make sure the design is right. You follow through with accurate toolmaking and correct heat treating. But there is *one* factor involved in the success of your die, over which you have only indirect control. That factor is the *soundness* of the die steel you start with. After all, if the steel itself isn't right, you needlessly risk your entire investment.

How can you be *sure* the die steel you use has what it takes to assure good tools? The answer lies in the painstaking controls regularly practiced by the steel manufacturer. Listed here are the four important tool steel controls pioneered by Carpenter to give steel users like yourself the protection you need. Before you place that next tool steel order, ask yourself, "Does our steel supplier guarantee these four quality controls in the die steel we use?" Then remember: You can be *sure* of them when you specify Carpenter Matched Tool and Die Steels. And you don't pay anything extra! THE CARPENTER STEEL COMPANY, 121 W. Bern St., Reading, Pa.

4 Tool and Die Steel Developments *Pioneered by* Carpenter Help Carpenter Customers Cut Costs, Improve Die Performance

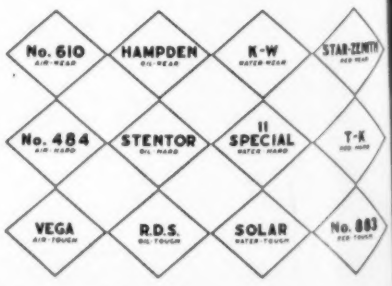
Since 1929:
HOT ACID DISC INSPECTION has been standard practice at Carpenter. To Carpenter customers it provides full assurance that Matched Tool and Die Steels are internally sound, shipment after shipment.

Since 1930:
The TOUGH TIMBRE TEST has assured Carpenter users a wider safe hardening range, greater dependability in performance.

Since 1933:
The TORSION IMPACT TEST has provided Carpenter Matched Tool and Die Steel users with more complete heat treating information that leads to better tools and dies.

Since 1940:
The CONE TEST, used to check and control hardenability of Carpenter water-hardening Matched Tool and Die Steels, has made sure that sections of the same size have uniform hardness penetration in lot after lot.

Carpenter STEEL — Matched Tool and Die Steels



Export Department: The Carpenter Steel Co., Port Washington, N.Y.—"CARSTEELCO"

Mill-Branch Warehouses and Distributors in Principal Cities Throughout the U.S.A. and Canada

Market Briefs and Bulletins

Makes Wheel Pricing Easier . . . Carborundum Co. reports it has worked out a simplified system for pricing grinding wheels. Under the new arrangement basic prices, ordering quantities and discounts will all appear on the same page. Price additions on special wheels have been eliminated and practically all wheels are now quoted with a single discount. The company's new basic prices apply to all orders dated after June 14.

Sell More Airframes . . . Aircraft Industries Assn. reports airframe manufacturers sales in 1952 were 88.5 pct over 1951, but that net earnings of $81.7 million represented only a 2.2 pct margin on sales. Backlogs at the end of 1952 totaled $11 billion as compared with $8.5 billion at the end of 1951. The association believes 1953 and 1954 will be the peak years of the present production climb.

Tubing Up . . . Tubular Products Div. of Babcock & Wilcox Co. has increased prices on its seamless carbon and alloy steel tubing effective with shipments made after May 12.

Raise Transformer Prices . . . General Electric Co.'s Distribution Transformer Dept. has raised prices approximately 8 pct on its distribution transformers, network transformers, light duty load centers and transformers for load center substations.

More for War . . . Ordnance deliveries in June will hit a $1 billion per month rate for the first time, according to Maj. Gen. E. L. Cummings, assistant ordnance chief. This production rate will be double the 1952 average.

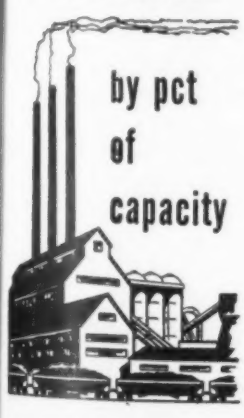
Cheaper Titanium . . . Forecast that titanium may be selling for $2 to $3 per lb within 2 years was made by Thomas W. Lippert, a former IRON AGE editor and now manager of sales and technical services for the Titanium Metals Corp. of America, at a businessmen's meeting in Birmingham this week. Mr. Lippert said that if the government continues to pay its current high rate of about $30,000 per ton for 2 more years, the industry will have a chance to recover the huge sums expended in getting started. Then it will be possible to produce titanium for civilian purposes at a much lower price.

Bethlehem Gets Ford Contract . . . Bethlehem Pacific gained its largest steelwork order of the year last week—a contract to supply steel for construction of Ford Motor Co.'s new $50 million Milpitas, Calif., assembly plant. Most of the steel for the new plant will come from eastern Bethlehem mills with all fabrication being done at Alameda, Calif. The plant is to be finished late this winter.

More Chrome . . . Mouat chromium mine in southern Montana was reactivated last week. The mine is expected to produce 900,000 tons of chrome concentrates during the next 8 years. American Chrome Co., San Francisco, will operate it under government contract.

Return Steel to Owners . . . Approval of the Iron & Steel Bill last week opened the way for the return of Britain's steel industry to private enterprise. The new act sets up an Iron & Steel Holding & Realisation Agency which will be responsible for disposing of the government's holdings in 90 nationalized companies.

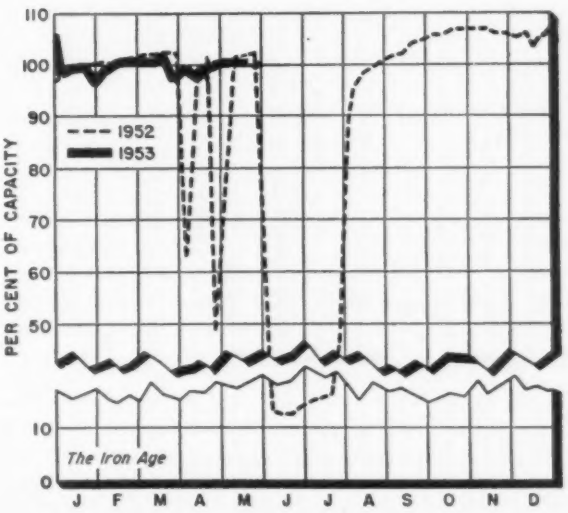
STEEL OPERATIONS



District Operating Rates

District	Week of May 17	Week of May 10
Pittsburgh	99.0	98.0*
Chicago	106.0	106.0
Philadelphia	98.0	98.0
Valley	102.0	102.0
West	107.5	106.5*
Cleveland	97.5	94.5*
Buffalo	104.5	104.5*
Detroit	105.0	108.0
Birmingham (South)	101.0	102.0
Wheeling	103.0	103.0
South Ohio River	87.0	89.5
St. Louis	89.5	92.0
East	75.0	82.5*
AGGREGATE	100.5	101.0

Beginning Jan. 1, 1953, operations are based on annual capacity of 117,522,470 net tons.
* Revised



UNIVERSITY OF MICHIGAN LIBRARIES

Review Third Aluminum Expansion Round

Olin Industries, Wheland Co. seek government financing . . . Without it, they say, they'd have to drop out of the third round . . . Policies studied in Washington—*By R. L. Hatschek.*

Without a reversal of certain government policies the third aluminum expansion round may be evaporating. On paper it looked like the most successful, going well over the 200,000-ton goal. But financing difficulties have now cropped up and threaten to force two of the three participating firms to drop out.

Olin Industries, Inc., scheduled for 110,000 tons of the expansion target, and the Wheland Co., slated for 50,000 tons, claim they need more than fast tax write-offs and 5-year government supply contracts to guarantee the necessary investment. They want government loans.

Certificates Granted . . . Certificates of necessity totaling some $170 million had been granted for Olin's project and $57,610,000 had been granted to Wheland for alumina refining and aluminum reduction facilities. It had been thought that with the certificates and the 5-year stockpile contracts it wouldn't prove too difficult to obtain private capital. But it did.

If the financing is not obtained from the government and the firms throw in the towel, only Harvey Machine Co. will be left in the third round. This will cut the round from 214,000 tons capacity to 54,000 tons. And it will cut the total projected industry capacity to about 1,580,000 tons instead of the 1,740,000 tons planned.

May Rebuild Program . . . This isn't the first time that availability of capital has slowed the aluminum program. Several firms which had expressed interest in either primary production or fabrication early in the game were forced out for similar reasons.

Outlook is that the Administration will now study its fiscal, mobilization and hydro-power policies see just where this third round should fit in. Justice Dept. still opposes further expansion by the Big Three without an influx of new producers. And budget-cutting and get-the-government-out-of-business aims may slow the solution of the aluminum problem.

March Was Peak . . . Primary magnesium production in March totaled 10,356 tons, highest since World War II. This was 92 pct of the industry's rated capacity and may well prove to be a peak since five of the government's six plants are being shut down. Alltime record month for magnesium production was January 1944 when output of magnesium reached 20,056 tons.

NONFERROUS METAL PRICES

(Cents per lb. except as noted)

	May 13	May 14	May 15	May 16	May 18	May 19
Copper, electro, Conn.	29.75-30.00	29.75-30.00	29.75-30.00	29.75-30.00	29.75-30.00	29.75-30.00
Copper, Lake delivered	....	....	....	....	....	....
Tin, Straits, New York	97.00	98.00	98.50	....	99.50	99.50*
Zinc, East St. Louis	11.00	11.00	11.00	11.00	11.00	11.00
Lead, St. Louis	12.30	12.30	12.30	12.30	12.55	12.55

Note: Quotations are going prices.
*Tentative

Arguments Go On . . . Lead and zinc mining firms continue to fight for the imposition of sliding scale tariffs on these metals which would peg them at a base of 15.5¢ per lb. It was even proposed that the Simpson Bill be modified to add more than 1¢ per lb tariff for each 1¢ the metals are below the base. The proposal calls for 1.5¢ tariff on metals, 1.05¢ for lead in ores and concentrates and 0.9¢ for zinc in ores and concentrates.

Producers continue to say that consumers of lead and zinc would benefit from the more stable market. They claim that product prices dependent on metal prices could be established in advance without the danger of losses and that the sliding tariffs would be insurance against a drop in inventory value.

Consumers Dissent . . . Buyers of lead and zinc would seem to be well satisfied with the present setup. They oppose variable tariffs, pointing out that even under normal conditions considerable quantities must be imported.

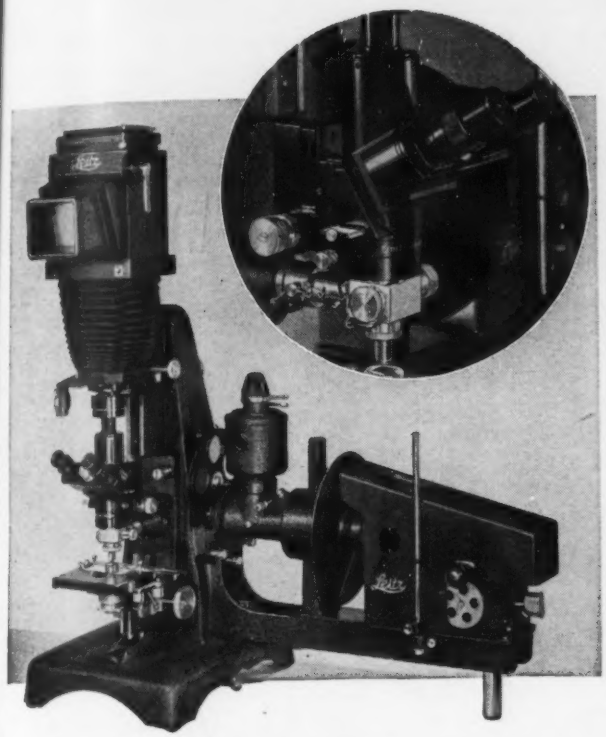
Consumers say that the lead and zinc mining industry could solve its problems by other methods—and they've suggested several. They include sliding scale wages, better salesmanship and research, income tax relief and a free gold market.

Buy Stockpile Zinc . . . General Services Administration last week bought 2000 tons of High Grade zinc for 11.0¢ per lb. This material is to be shipped to individual countries as the need arises and be charged back against the defense support allotment of each nation supplied, the agency said. Since this grade of zinc is extremely easy at present, little surprise was noted in trade circles at the low price.

Later in the week the government was reported to have purchased another 1000 tons of the same grade at a lower price.

Microscope, camera and light source in one convenient unit!

Leitz Panphot



Universal Metallograph

In the *Panphot*, Leitz offers the perfect combination of research microscope and reflex camera for the metallurgical research laboratory. Operating parts for observation and photomicrography are right at hand, and you can change from one to the other quickly and dependably . . . without moving from your chair. Light source, microscope and camera are permanently aligned in a single, easy-to-use instrument.

Designed to meet a wide range of needs, the *Panphot* permits the use of reflected light, darkfield illumination and polarized light. A full line of accessories is available to equip the instrument for all types of photomicrography, photomacrography and for drawing and projecting micro images. The *Panphot* takes 3¼" x 4¼" or 4" x 5" plates or cut film for both black and white and color work.

Another of the famous Leitz microscopes, recognized everywhere as the finest microscopes made anywhere.

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E. **LEITZ, Inc.,** 468 Fourth Ave., New York 16, N. Y.

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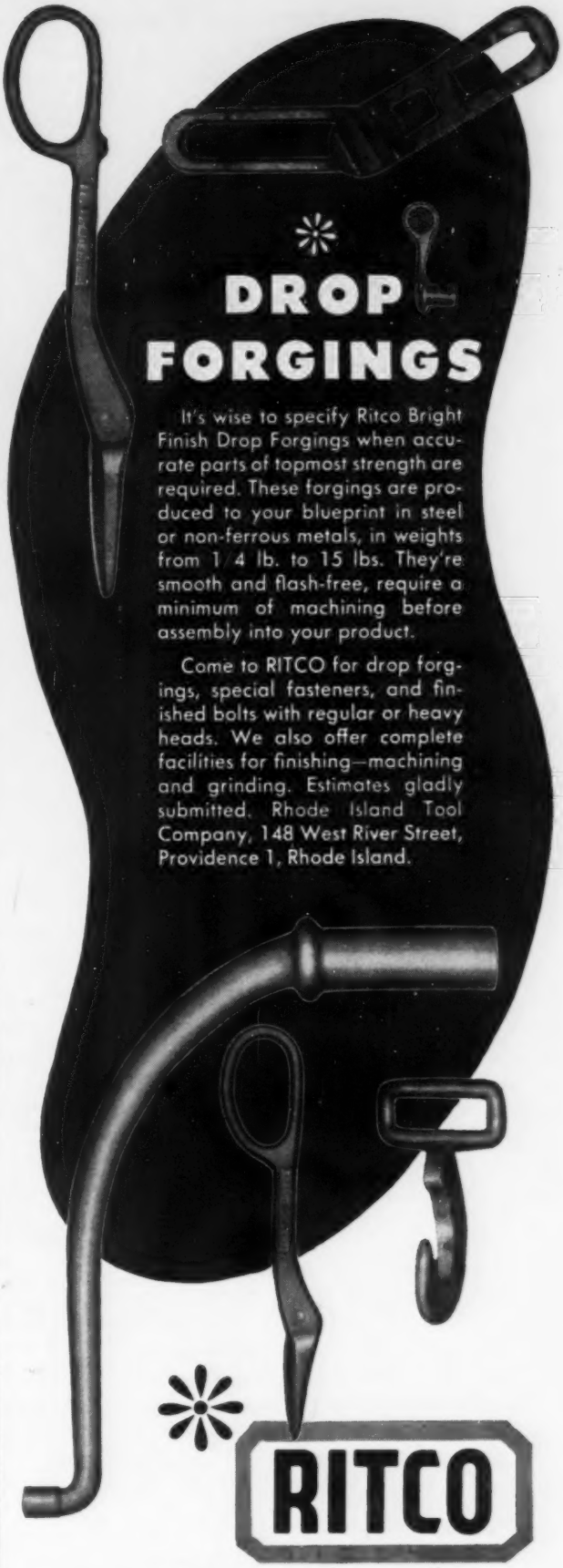
DROP
FORGINGS
It's wise to specify Ritco Bright Finish Drop Forgings when accurate parts of topmost strength are required. These forgings are produced to your blueprint in steel or non-ferrous metals, in weights from 1/4 lb. to 15 lbs. They're smooth and flash-free, require a minimum of machining before assembly into your product.
Come to RITCO for drop forgings, special fasteners, and finished bolts with regular or heavy heads. We also offer complete facilities for finishing—machining and grinding. Estimates gladly submitted. Rhode Island Tool Company, 148 West River Street, Providence 1, Rhode Island.
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EXCLUSIVE NEW ENGLAND REPRESENTATIVES
FOR CLEVELAND CAP SCREWS

★ SERVING AMERICAN INDUSTRY SINCE 1834 ★

UNIVERSITY OF MICHIGAN LIBRARIES

Nonferrous Prices

(Effective May 19, 1953)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188-in., 2S, 3S, 32.9¢; 4S, 61S-O, 34.9¢; 52S, 37.2¢; 24S-O, 24S-OAL, 35.9¢; 75S-O, 75S-OAL, 43.6¢. 0.081-in., 2S, 3S, 34.1¢; 4S, 61S-O, 36.6¢; 52S, 38.9¢; 24S-O, 24S-OAL, 37.2¢; 75S-O, 75S-OAL, 45.7¢. 0.032-in., 2S, 3S, 35.9¢; 4S, 61S-O, 40.6¢; 52S, 43.5¢; 24S-O, 24S-OAL, 45.6¢; 75S-O, 75S-OAL, 57.0¢.

Plate, ¼-in. and Heavier: 2S-F, 3S-F, 30.9¢; 4S-F, 33.0¢; 52S-F, 34.7¢; 61S-O, 33.6¢; 24S-O, 24S-OAL, 35.4¢; 75S-O, 75S-OAL, 42.3¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.4¢ to 80.3¢; 12 to 14, 37.1¢ to 97.2¢; 24 to 26, 39.7¢ to $1.27; 36 to 38, 47.0¢ to $1.86.

Rod, Rolled: 1.064-in. to 4.5-in., 2S-F, 3S-F, 41.0¢ to 36.6¢; cold-finished, 0.375-in. to 3.499-in., 2S-F, 3S-F, 44.2¢ to 38.3¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32-in., 58.4¢ to 45.9¢; ⅜ to 1½-in., 46.3¢ to 42.6¢; 1 9/16 to 3-in., 42.0¢ to 39.3¢. Base 5000 lb.

Drawn Wire: Coiled 0.051 to 0.374-in., 2S, 43.2¢ to 31.7¢; 52S, 52.4¢ to 38.3¢; 17S-T4, 59.0¢ to 41.0¢; 61S-T4, 52.9¢ to 40.5¢.

Extruded Tubing: Rounds, 63S-T5, OD 1¼ to 2 in., 40.5¢ to 59.0¢; 2 to 4 in., 36.6¢ to 49.7¢; 4 to 6 in., 37.1¢ to 45.3¢; 6 to 9 in., 37.6¢ to 47.5¢.

Roofing Sheet: Flat, per sheet, 0.019-in., 28 x 72 in., $1.247; x 96 in., $1.662; x 120 in., $2.077; x 144 in., $2.494. Coiled sheet, per lb, 0.019 in. x 28 in., 30.8¢; 0.024 in. x 28 in., 29.3¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 66¢; 3/16 in., 68¢; ⅛ in., 70¢; B & S Gage 10, 71¢; 12, 75¢. Specification grade higher. Base 30,000 lb.

Extruded Round Rod: M, diam ¼ to 0.311 in., 77¢; ⅜ to ¾ in., 60.5¢; 1¼ to 1.749 in., 56¢; 2½ to 5 in., 51.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 65.3¢; 0.22 to 0.25 lb, 5.9 in., 62.3¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.59 lb, 19.5 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD, ¼ to 5/16 in., $1.43; 5/16 to ⅝ in., $1.29; ½ to ⅝ in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall: OD, ⅝ to ¾ in., 64¢; 1 to 2 in., 60¢; 3 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(100,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	86½	67½	92½
Strip, CR	92½	70½	98½
Rod, bar	82½	65½	88½
Angles, HR	82½	65½	88½
Plate, HR	84½	66½	90½
Seamless Tube	115½	100½	137½
Shot, blocks		57	

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	48.51		50.58
Copper, h-r	50.48	46.83	
Copper, drawn		48.08	
Low brass	45.99	45.68	
Yellow brass	42.87	42.56	
Red brass	47.11	46.80	
Naval brass	47.01	41.07	42.33
Leaded brass			39.95
Com. bronze	48.76	48.45	
Mang. bronze	50.73	44.62	46.18
Phos. bronze	70.50	70.75	
Muntz metal	44.91	40.47	41.72
Ni silver, 10 pct	56.56	59.83	62.89

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	20.50
Aluminum pig	19.50
Antimony, American, Laredo, Tex.	34.50
Beryllium copper, per lb conta'd Be.	$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$2.40 to $2.47
Copper, electro, Conn. Valley	29.50 to 30.00
Copper, Lake, delivered	
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$175 to $185
Lead, St. Louis	12.55
Lead, New York	12.75
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb.	27.00
Magnesium, sticks, 100 to 500 lb.	45.00 to 47.00
Mercury, dollars per 76-lb. flask, f.o.b. New York	$195 to $197
Nickel electro, f.o.b. N. Y. warehouse	63.08
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	56.25
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	85.25
Tin, New York	99.50
Titanium, sponge	$5.00
Zinc, East St. Louis	11.00
Zinc, New York	11.83
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	26.00
No. 120	25.00
No. 123	24.00
80-10-10 ingot	
No. 305	30.00
No. 315	28.00
88-10-2 ingot	
No. 210	38.25
No. 215	34.75
No. 245	30.25
Yellow ingot	
No. 405	21.25
Manganese bronze	
No. 421	26.50

Aluminum Ingot

(Cents per lb del'd., 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	24.50-26.00
0.60 copper, max.	24.25-25.50
Piston alloys (No. 122 type)	22.50-24.00
No. 12 alum. (No. 2 grade)	22.00-22.50
108 alloy	22.50-23.50
195 alloy	22.75-24.00
13 alloy (0.60 copper max.)	24.25-24.75
ASX-679	22.50-23.50

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	23.00-26.00
Grade 2—92-95%	22.50-24.50
Grade 3—90-92%	22.00-23.50
Grade 4—85-90%	20.50-23.00

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper	
Cast, oval, 15 in. or longer	45.14
Electrodeposited	37.98
Flat rolled	45.64
Brass, 80-20	
Cast, oval, 15 in. or longer	43.515
Zinc, flat cast	20.25
Ball, anodes	18.50
Nickel, 99 pct plus	
Cast	79.50
Roller, depolarized	80.50
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	94½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	30.00
Nickel chloride, 375 lb drum	38.00
Silver cyanide, 100 oz lots, per oz.	75½
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over.)

	Heavy	Turnings
Copper	28⅝	27⅝
Yellow brass	21⅝	19⅝
Red brass	25⅛	24⅛
Comm. bronze	26⅛	25⅛
Mang. bronze	20	19½
Brass rod ends	19¾	

Custom Smelters' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	22½—23½
No. 2 copper wire	21 —22
Light copper	20 —20½
*Refinery brass	19½—20

* Dry copper content.

Ingot Makers' Scrap

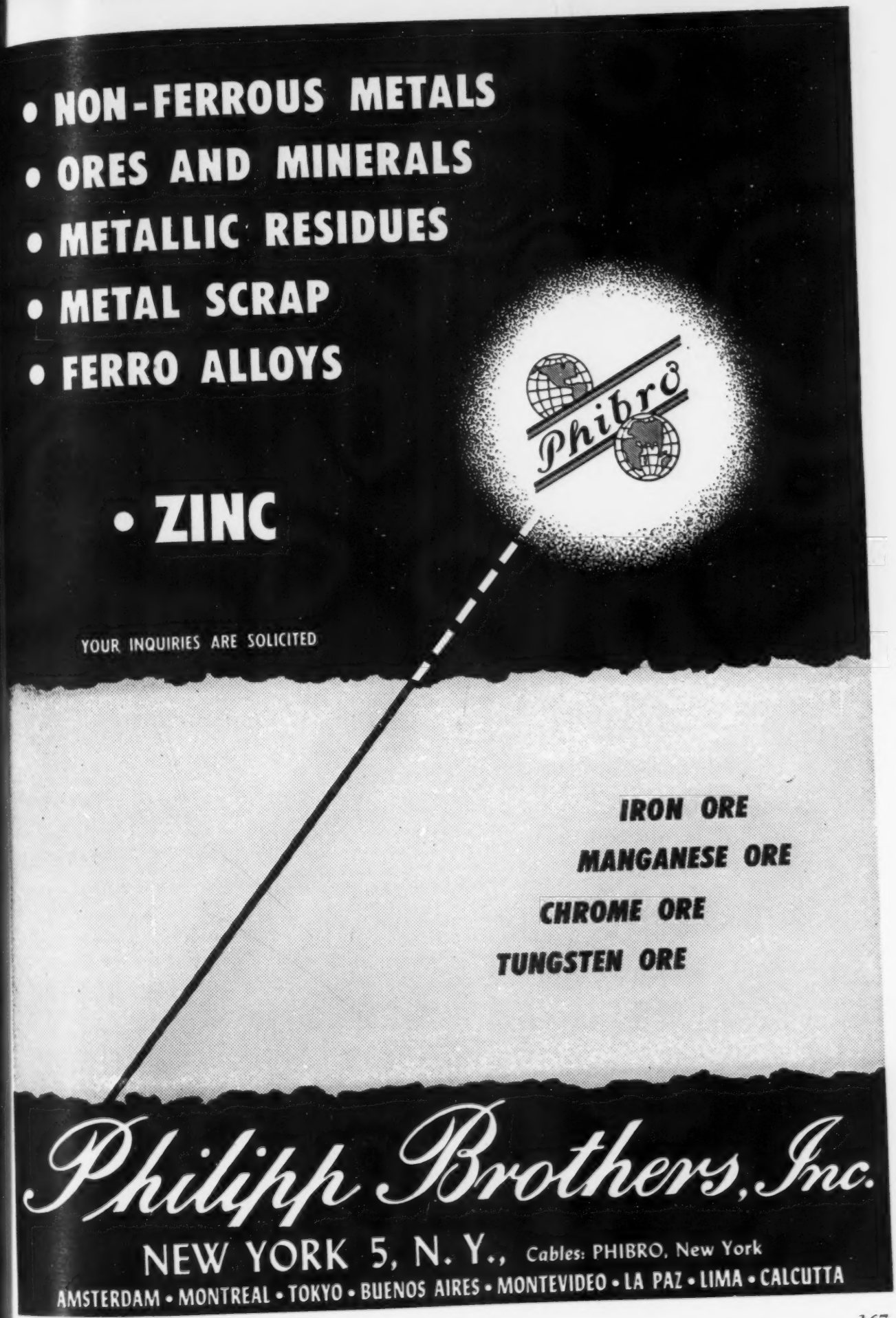
(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	22½—23½
No. 2 copper wire	21 —22
Light copper	19½—20½
No. 1 composition	18
No. 1 comp. turnings	17½
Rolled brass	14
Brass pipe	16
Radiators	14
Aluminum	
Mixed old cast	13¾—13½
Mixed new clips	13 —15
Mixed turnings, dry	12½—14
Pots and pans	13¾—13½

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	21 —22
No. 2 heavy copper and wire	19 —20
Light copper	17½—18½
New type shell cuttings	17½—18½
Auto radiators (unsweated)	18
No. 1 composition	16½—17
No. 1 composition turnings	16 —16½
Unlined red car boxes	15 —16
Cocks and faucets	15
Mixed heavy yellow brass	11½
Old rolled brass	14
Brass pipe	16
New soft brass clippings	16½—17½
Brass rod ends	16 —16½
No. 1 brass rod turnings	15 —16
Aluminum	
Alum. pistons and struts	5 — 5½
Aluminum crankcases	8
2S aluminum clippings	11½—12
Old sheet and utensils	8
Borings and turnings	5½
Misc. cast aluminum	8
Dural clips (24S)	9
Zinc	
New zinc clippings	5½
Old zinc	4½
Zinc routings	2½
Old die cast scrap	3½
Nickel and Monel	
Pure nickel clippings	100
Clean nickel turnings	60 —70
Nickel anodes	100
Nickel rod ends	100
New Monel clippings	33 —35
Clean Monel turnings	25
Old sheet Monel	30 —32
Nickel silver clippings, mixed	14
Nickel silver turnings, mixed	12
Lead	
Soft scrap, lead	9¼— 9¾
Battery plates (dry)	4¾— 5
Batteries, acid free	3¾
Magnesium	
Segregated solids	15 —16
Castings	14 —15
Miscellaneous	
Block tin	50
No. 1 pewter	55
No. 1 auto babbitt	45
Mixed common babbitt	13½—14
Solder joints	15
Siphon tops	45
Small foundry type	14½
Monotype	12 —12½
Lino. and stereotype	11 —11½
Electrotype	9¼— 9½
Hand picked type shells	7½
Lino. and stereo. dross	4
Electro dross	3½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Market Tone Stays Soft, Demand Idles

Steel mill business channelled to scrap generating manufacturers . . . Prices may firm up when buying drought ends—later . . . Mill shows new way of testing bundles.

Still idling along, the scrap iron and steel market waited for steel mill stockpiles to decline to the point where more substantial orders would be generated. Meanwhile, steel mill business is channeled to industrial producers of scrap, operating at peak manufacturing levels.

When the order drought wears off many scrap men expect a firming of prices—but because this seems some time away no one is speculating. Many scrap centers report drastic reductions in dealer scrap receipts. Betraying the weakness of today's market, THE IRON AGE No. 1 scrap composite fell 50¢ to $38.17—a slide of $6.08 in recent weeks.

In Pittsburgh steelmaking grades dipped $1 to $2, with turnings following the trend. Other price drops were reported elsewhere but there was considerable feeling that the bottom was close at hand and new orders might even lift prices up.

Bethlehem demonstrated a new and explosive way of testing quality of bundles — reported to be easier and more thorough than the customary way of sawing them in half. (See p. 83.)

Pittsburgh — Latest purchases accentuate weakness of the market. No. 2 heavy melting is off $1 and No. 2 bundles off $2 from last week on basis of sales. Top melting grades slipped off sympathetically. Short turnings were also down. Heavy breakable cast was off $1. With industrial scrap being generated in good volume, consumer inventories are being maintained. This accounts to some extent for the mills' lack of interest in dealer material.

Chicago—Railroad lists last week took another slump. Market savants were viewing with alarm the blast furnace grades, which, after staggering for weeks, were suddenly heartened by a mill sale. In a market where blast furnace had been well nigh dead, the tonnages looked large. But the sale began no fever of activity and it is expected that blast furnace will not hold up well.

Philadelphia — New business was done early this week at the previous level for No. 1 steel and No. 1 bundles but $1 lower for No. 2 steel. No. 2 bundles don't seem salable at any figure. Low phos is very quiet but prices are holding. Better grades of turnings slipped off $1 per gross ton.

New York—The market continues very slow here. Trade sources don't expect any quick recovery, but generally are philosophic, pointing out that mill inventory depletion is going on at a faster rate than new purchases. Prices are generally unchanged except a decline of $1 in shoveling turnings and some cast.

Detroit—Some slight downward adjustments continued in this market, but signs of leveling off were appearing. Industrial scrap is satisfying mill demand for No. 1 grades, but consumers are showing some inclination to enter the market for No. 2 grades at a low price. In spite of high inventories current prices look good to buyers because most of their present stocks were accumulated at much higher prices.

Cleveland—Stronger market could follow recent flurry of clean-ups on expiring orders. Turnings market dropped $2 to $27 delivered as one local consumer bought dealer stock. Increased dealer resistance to sales at current price levels is being interpreted as a good omen for firmer market tone. Bidding on automotive lists should provide the acid test for optimists who believe market has hit bottom and is on the way up.

Birmingham — The southern scrap market appears in a slump. Orders from mills are slow and little volume is moving even at prices now being offered. Dealers say only a trickle of scrap is coming into their yards. Southern mills and most of those in the north are making no differentiation in prices paid for No. 1 and No. 2 heavy melting and No. 1 and No. 2 bundles, all orders for these categories reading: "No. 1 and/or No. 2" and seemingly being satisfied to get only No. 2.

St. Louis — Buying by consumers here continues on a very limited scale as inventories are still at a high level. Prices are unchanged. There is a feeling in the trade that present prices will hold, as the movement has not been heavy and mills are concerned about too low prices stopping the flow of scrap.

Cincinnati — Most dealer scrap is still soft here as mills continue to limit buying. Dealer take has slowed to a trickle and some experts predict a price spiral if a buying rush starts. At present most dealers believe heavy movement of production scrap is keeping the market down. Price structure was steady and unchanged with the exception of turnings, which slipped from $2 to $3.

Boston—After a long period of steeply tumbling prices there are slight traces of a firming market for steel grades in the New England area. No. 2 steelmaking grades and high quality turnings have edged up a bit on the high side of the range. But cast scrap is still slipping and sales are scarce.

Buffalo—With buying interest at low ebb, price declines of $1 to $2 a ton were posted in scrap market here. One mill placed an embargo on turnings, while another mill was accepting restricted tonnage. Steelmaking grades were off $1, while cast items declined $2. Cast sales were reported at lower ranges while ingot items reflected lower prices among dealers.

West Coast—Los Angeles market settled lower last week with most sales going at the bottom of the price range quoted previously. No. 3 bundles also dropped $2 there to $16. In San Francisco cast sales to foundries picked up but prices remain unchanged. In the Seattle area, buying continues steadily with a good supply-demand balance.

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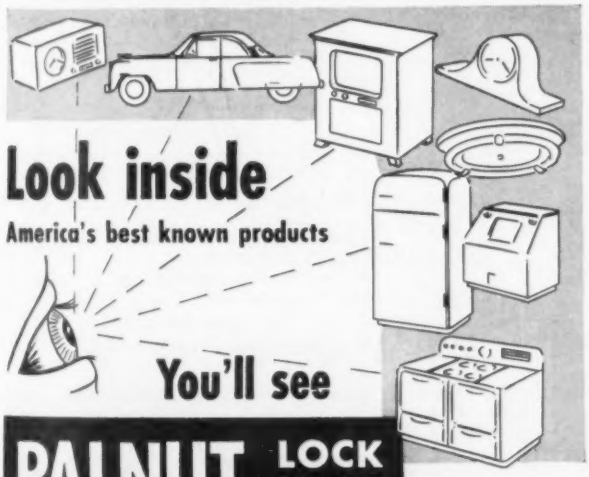

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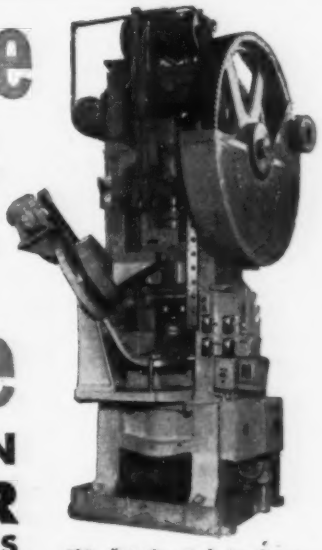

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Scrap Prices

(Effective May 19, 1953)

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	38.00 to 39.00
No. 2 bundles	31.00 to 32.00
Machine shop turn	25.50 to 26.00
Mixed bor. and ms. turns.	25.50 to 26.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	30.00 to 31.00
Low phos. punch'gs, plate	45.00 to 46.00
Heavy turnings	38.00 to 39.00
No. 1 RR. hvy. melting	43.00 to 44.00
Scrap rails, random lgth.	45.00 to 46.00
Rails 2 ft and under	51.00 to 52.00
RR. steel wheels	50.00 to 51.00
RR. spring steel	50.00 to 51.00
RR. couplers and knuckles	50.00 to 51.00
No. 1 machinery cast.	49.00 to 50.00
Cupola cast	40.00 to 41.00
Heavy breakable cast.	37.00 to 38.00
Malleable	44.00 to 45.00

Chicago

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 factory bundles	37.00 to 38.00
No. 1 dealers' bundles	35.00 to 36.00
No. 2 dealers' bundles	30.00 to 32.00
Machine shop turn.	17.00 to 19.00
Mixed bor. and turn.	17.00 to 19.00
Shoveling turnings	18.00 to 20.00
Cast iron borings	17.00 to 19.00
Low phos. forge crops	43.00 to 44.00
Low phos. punch'gs, plate	39.00 to 41.00
Low phos. 3 ft and under	40.00 to 41.00
No. 1 RR. hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	43.00 to 44.00
Rerolling rails	45.00 to 47.00
Rails 2 ft and under	49.00 to 50.00
Locomotive tires, cut	45.00 to 46.00
Cut bolsters & side frames	44.00 to 45.00
Angles and splice bars	45.00 to 47.00
RR. steel car axles	47.00 to 48.00
RR. couplers and knuckles	44.00 to 46.00
No. 1 machinery cast.	40.00 to 42.00
Cupola cast	37.00 to 39.00
Heavy breakable cast.	31.00 to 33.00
Cast iron brake shoes	34.00 to 35.00
Cast iron car wheels	38.00 to 40.00
Malleable	39.00 to 40.00
Stove plate	32.00 to 33.00

Philadelphia Area

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	30.00 to 31.00
Machine shop turn.	27.00 to 28.00
Mixed bor., short turn.	30.00 to 31.00
Shoveling turnings	31.00 to 32.00
Clean cast chem. borings	41.50 to 42.00
Low phos. 5 ft and under	43.50 to 44.50
Low phos. 2 ft and under	45.00 to 46.00
Low phos. punchings	45.50 to 46.50
Elec. furnace bundles	43.50 to 44.50
Heavy turnings	39.50 to 40.50
RR. steel wheels	49.00 to 50.00
RR. spring steel	49.00 to 50.00
Rails 18 in. and under	55.00 to 56.00
Cupola cast	37.00 to 40.00
Heavy breakable cast.	41.00 to 42.00
Cast iron carwheels	46.00 to 47.00
Malleable	46.00 to 47.00
Unstripped motor blocks.	29.00 to 30.00
No. 1 machinery cast.	47.00 to 48.00
Charging box cast.	40.00 to 41.00

Cleveland

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	38.00 to 39.00
No. 2 bundles	33.00 to 34.00
No. 1 busheling	38.00 to 39.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	26.00 to 27.00
Shoveling turnings	26.00 to 27.00
Cast iron borings	26.00 to 27.00
Low phos. 2 ft and under	43.00 to 44.00
Drop forge flashings	38.00 to 39.00
No. 1 RR. hvy. melting	45.00 to 46.00
Rails 3 ft and under	52.00 to 53.00
Rails 18 in. and under	55.00 to 56.00
Railroad grate bars	40.00 to 41.00
Steel axle turnings	38.00 to 39.00
Railroad cast	47.00 to 48.00
No. 1 machinery cast.	47.00 to 48.00
Stove plate	43.00 to 44.00
Malleable	48.00 to 49.00

Youngstown

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 bundles	39.00 to 40.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	23.00 to 24.00
Shoveling turnings	26.00 to 27.00
Cast iron borings	26.00 to 27.00
Low phos. plate	47.00 to 48.00

Buffalo

No. 1 hvy. melting	$40.50 to $41.50
No. 2 hvy. melting	38.00 to 38.50
No. 1 busheling	40.50 to 41.50
No. 1 bundles	40.50 to 41.50
No. 2 bundles	36.00 to 36.50
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	27.00 to 28.00
Low phos. plate	44.00 to 45.00
Scrap rails, random lgth.	45.75 to 46.75
Rails 2 ft and under	51.75 to 52.75
RR. steel wheels	50.75 to 51.75
RR. spring steel	50.75 to 51.75
RR. couplers and knuckles	50.75 to 51.75
No. 1 machinery cast.	42.00 to 43.00
No. 1 cupola cast.	38.00 to 39.00

Detroit

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 bundles, openhearth	36.00 to 37.00
No. 2 bundles	23.00 to 24.00
Heavy turnings	27.00 to 28.00
New busheling	34.00 to 35.00
Drop forge flashings	34.00 to 35.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Electric furnace, bundles.	37.00 to 38.00
Low phos. punch'gs, plate	39.50 to 40.50
No. 1 cupola cast	44.00
Heavy breakable cast.	36.00
Stove plate	39.00
Automotive cast.	44.00

St. Louis

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	30.00 to 31.00
No. 2 bundled sheets	28.00 to 30.00
Machine shop turn.	16.00 to 18.00
Shoveling turnings	17.00 to 19.00
Cast iron borings	13.00 to 14.00
Rails, random lengths	41.00 to 42.00
Rails 18 in. and under	50.00 to 52.00
Locomotive tires, uncut	43.00 to 44.00
Angles and spike bars	44.00 to 45.00
Std. steel car axles	48.00 to 50.00
RR. spring steel	43.00 to 44.00
Cupola cast.	40.00 to 41.00
Hvy. breakable cast.	30.00 to 32.00
Cast iron brake shoes	39.00 to 40.00
Stove plate	37.00 to 38.00
Cast iron car wheels	45.00 to 46.00
Malleable	35.00 to 36.00
Unstripped motor blocks.	33.00 to 34.00

New York

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	29.00 to 29.50
No. 2 bundles	25.00 to 26.00
Low phos. 2 ft and less.	37.00 to 38.00
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Clean cast chem. borings	32.00 to 33.00
No. 1 machinery cast.	42.00 to 43.00
Mixed yard cast.	33.00 to 34.00
Charging box cast.	35.00 to 36.00
Heavy breakable cast.	35.00 to 36.00
Unstripped motor blocks.	22.00 to 23.00

Birmingham

No. 1 hvy. melting	$29.50 to $30.50
No. 2 hvy. melting	27.00 to 28.00
No. 1 bundles	29.50 to 30.50
No. 2 bundles	25.00 to 26.00
No. 1 busheling	29.50 to 30.50
Machine shop turn.	20.75 to 21.75
Shoveling turnings	22.75 to 23.75
Cast iron borings	22.75 to 23.75
Electric furnace bundles	32.00 to 33.00
Bar crops and plate	39.00 to 40.00
Structural and plate, 2 ft.	39.00 to 40.00
No. 1 RR. hvy, melting	35.00 to 36.00
Scrap rails, random lgth.	41.00 to 42.00
Rerolling rails	45.00 to 46.00
Rails, 18 in. and under	45.00 to 46.00
Angles & splice bars	45.00 to 46.00
Std. steel axles	45.00 to 46.00
No.1 cupola cast.	38.00 to 39.00
Stove plate	34.00 to 35.00
Cast iron car wheels	46.00 to 47.00
Charging box cast.	30.00 to 31.00
Heavy breakable	30.00 to 31.00
Unstripped motor blocks.	32.00 to 33.00
Mashed tin cans	17.00 to 18.00

Boston

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$30.75
No. 2 hvy. melting	$25.00 to 26.00
No. 1 bundles	30.25
No. 2 bundles	22.00 to 23.00
No. 1 busheling	29.00 to 31.00
Elec. furnace, 3 ft & under	33.25
Machine shop turn.	16.00 to 17.00
Mixed bor. and short turn.	20.00
Shoveling turnings	20.00 to 21.00
Clean cast chem. borings	31.13
Mixed cupola cast.	26.00 to 28.00
Heavy breakable cast.	30.00 to 31.00
Stove plate	26.00 to 27.00
Unstripped motor blocks.	22.00

Cincinnati

Brokers' buying prices per gross ton, on cars:

No. 1 hvy melting	$38.00 to $39.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 bundles	38.00 to 39.00
No. 2 bundles	31.00 to 32.00
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	21.00 to 22.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	21.00 to 22.00
Low phos. 18 in. & under	46.00 to 47.00
Rails, random lengths	41.00 to 42.00
Rails, 18 in. and under	52.00 to 53.00
No. 1 cupola cast.	41.00 to 42.00
Hvy. breakable cast.	37.00 to 38.00
Drop broken cast.	48.00 to 49.00

San Francisco

No. 1 hvy. melting	$29.00
No. 2 hvy. melting	25.00
No. 1 bundles	26.00
No. 2 bundles	23.00
No. 3 bundles	19.00
Machine shop turn.	11.00
Cast iron borings	15.00
No. 1 RR. hvy. melting	37.00
No. 1 cupola cast.	$39.00 to $40.00

Los Angeles

No. 1 hvy. melting	$24.00
No. 2 hvy. melting	20.00
No. 1 bundles	23.00
No. 2 bundles	20.00
No. 3 bundles	16.00
Mach. shop turn.	8.00
Shoveling turnings	12.00
Cast iron borings	12.00
Elec. fur. 1 ft and under.	29.00
No. 1 RR. hvy. melting	37.00
No. 1 cupola cast.	39.00

Seattle

No. 1 hvy. melting	$33.00
No. 2 hvy. melting	29.00
No. 1 bundles	32.00
No. 2 bundles	26.00
No. 1 cupola cast	37.00
Mixed yard cast.	35.00

Hamilton, Ont.

No. 1 hvy. melting	$35.50
No. 1 bundles	35.50
No. 2 bundles	35.00
Mechanical bundles	32.50
Mixed steel scrap	31.50
Bushelings	30.50
Bush., new fact. prep'd	33.50
Bush., new fact. unprep'd	32.50
Short steel turnings	32.50
Mixed bor. and turn.	32.50
Rails, remelting	35.50
Rails, rerolling	44.80
Cast scrap	50.00

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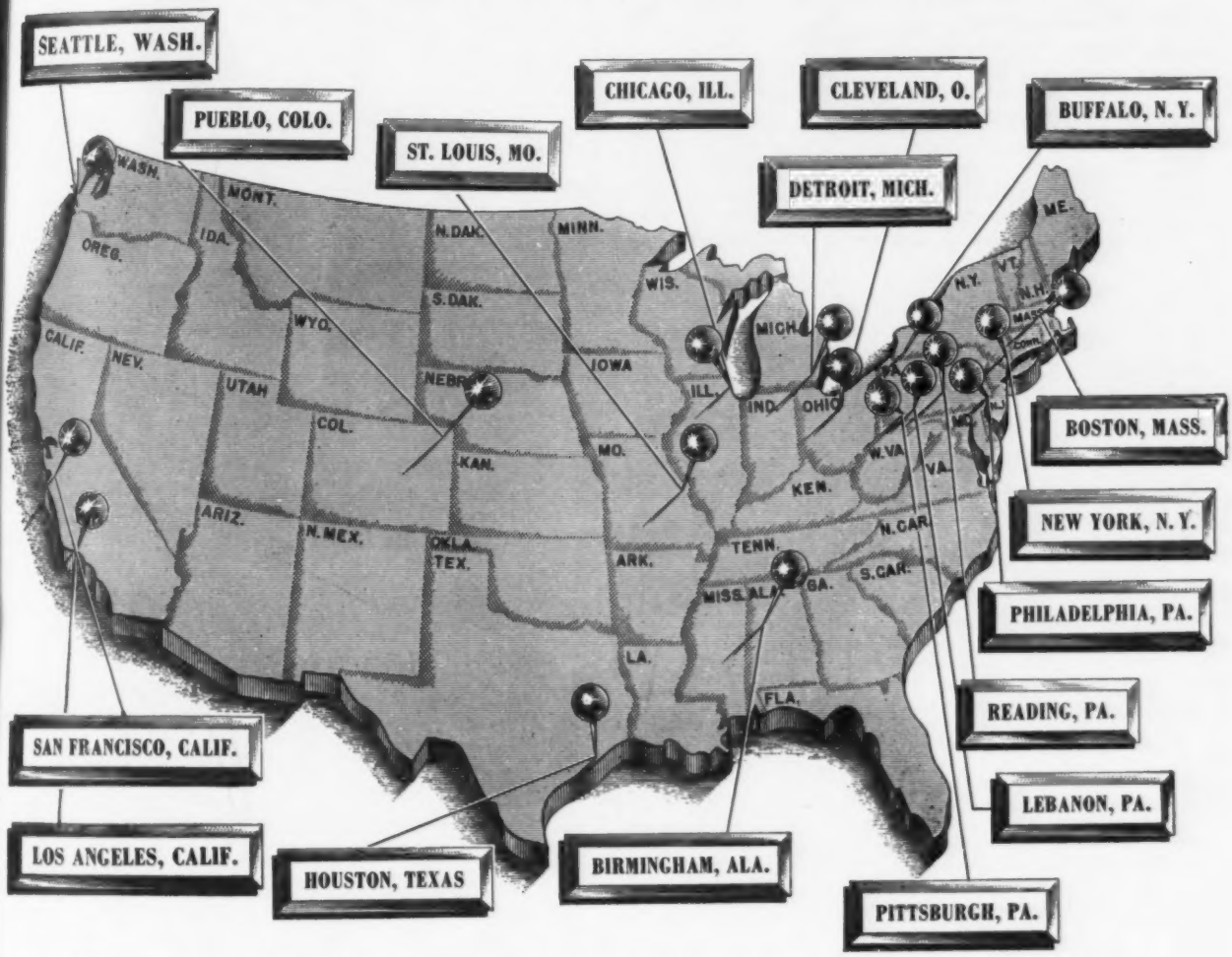

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

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Comparison of Prices

(Effective May 19, 1953)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	May 19 1953	May 12 1953	Apr. 21 1953	May 20 1952
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	3.775¢	3.775¢	3.775¢	3.60¢
Cold-rolled sheets	4.575	4.575	4.575	4.35
Galvanized sheets (10 ga)	5.075	5.075	5.075	4.80
Hot-rolled strip	3.725	3.725	3.725	3.50
Cold-rolled strip	5.20	5.20	5.20	4.75
Plate	3.90	3.90	3.90	3.70
Plates wrought iron	9.00	9.00	9.00	7.85
Stainl's C-R strip (No. 302)	39.75	39.75	39.75	36.75
Tin and Ternplate: (per base box)				
Tinplate (1.50 lb.) cokes	$8.95	$8.95	$8.95	$8.70
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.40
Special coated mfg. ternes	7.75	7.75	7.75	7.50
Bars and Shapes: (per pound)				
Merchant bars	3.95¢	3.95¢	3.95¢	3.70¢
Cold finished bars	4.925	4.925	4.925	4.55
Alloy bars	4.675	4.675	4.675	4.30
Structural shapes	3.85	3.85	3.85	3.65
Stainless bars (No. 302)	34.00	34.00	34.00	31.50
Wrought iron bars	10.05	10.05	10.05	9.50
Wire: (per pound)				
Bright wire	5.225¢	5.225¢	5.225¢	4.85¢
Rails, (per 100 lb.)				
Heavy rails	$4.075	$4.075	$3.775	$3.60
Light rails	5.00	5.00	4.25	4.00
Semifinished Steel: (per net ton)				
Rerolling billets	$59.00	$59.00	$59.00	$56.00
Slabs, rerolling	59.00	59.00	59.00	56.00
Forging billets	70.50	70.50	70.50	66.00
Alloy blooms, billets, slabs	76.00	76.00	76.00	70.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.325¢	4.325¢	4.325¢	4.10¢
Skelp	3.55	3.55	3.55	3.35
Composite: (per pound)				
Finished steel base price	4.390¢	4.390¢	4.376¢	4.131¢

	May 19 1953	May 12 1953	Apr. 21 1953	May 20 1952
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$60.69	$60.69	$60.69	$56.19
Foundry, Valley	55.00	55.00	55.00	52.50
Foundry, Southern, Cin'ti	58.93	58.93	58.93	55.50
Foundry, Birmingham	51.38	51.38	51.38	48.88
Foundry, Chicago†	55.00	55.00	55.00	52.50
Basic del'd Philadelphia	59.77	59.77	59.77	57.27
Basic, Valley furnace	54.50	54.50	54.50	52.00
Malleable, Chicago†	55.00	55.00	55.00	52.50
Malleable, Valley	55.00	55.00	55.00	52.50
Ferromanganese‡	226.99	226.99	226.25	186.25

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.

‡ Average of U. S. Prices quoted on Ferroalloy pages.

Composite: (per gross ton)				
Pig iron	$55.26	$55.26	$55.26	$52.77
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	*$38.50*	$39.50	$42.50	$43.00*
No. 1 steel, Phila. area	40.50	40.50	42.50	41.50*
No. 1 steel, Chicago	*35.50*	36.00	38.00	41.50*
No. 1 bundles, Detroit	36.50	36.50	40.50	41.25*
Low phos., Youngstown	47.50	47.50	49.50	46.50*
No. 1 mach'y cast, Pittsburgh	49.50	49.50	50.50	52.75
No. 1 mach'y cast, Philadel'a.	47.50	47.50	47.50	52.00*
No. 1 mach'y cast, Chicago	*41.00*	42.50	45.50	45.50

* Basing pt., less broker's fee. † Shipping pt., less broker's fee. Delivered prices, including broker's fee, unless otherwise noted.

Composite: (per gross ton)				
No. 1 heavy melting scrap	*$38.17*	$38.67*	$41.00	$42.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75	$14.75	$14.75	$14.75
Foundry coke, prompt	17.25	17.25	17.25	17.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	29.875‡	29.875‡	30.00‡	24.50
Copper, Lake, Conn.	....	....	32.25	24.625
Tin, Straits, New York	99.50†	96.50	94.50	91.25
Zinc, East St. Louis	11.00	11.00	11.00	19.00
Lead, St. Louis	12.55	12.30	11.80	14.80
Aluminum, virgin ingot	20.50	20.50	20.50	19.00
Nickel, electrolytic	63.08	63.08	63.08	59.58
Magnesium, ingot	27.00	27.00	27.00	24.50
Antimony, Laredo, Tex.	34.50	34.50	34.50	44.00

† Tentative. ‡ Average. * Revised.

Composite Price Notes

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Scrap Steel Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Warehouse Price Notes

Base Quantities (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

Exceptions: (1)500 to 1499 lb, (2)6000 lb or over, (3)450 to 1499 lb, (4)2000 to 3999 lb.

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled A 4615 As rolled	Alloy Bars: Hot-Rolled A 4140 Annealed	Alloy Bars: Cold-Drawn A 4615 As rolled	Alloy Bars: Cold-Drawn A 4140 Annealed
Baltimore	$.20	5.81	7.17	7.38–8.04	6.42	.....	6.05	6.47	6.41	7.18–7.43	.....	.....	.....	.....
Birmingham	.15	5.80	6.65	7.70[1]	5.80	.....	6.10	5.95	5.80	7.85	.....	.....	.....	.....
Boston	.20	6.45–6.52	7.35–7.71	8.34–8.39	6.55	8.50[2]	6.75–6.80	6.56	6.42–6.57	7.49–7.64	10.85	11.15–11.17	12.85	13.15–13.18
Buffalo	.20	5.77–5.80	6.60–6.65	8.31	6.00–6.21	.....	6.30–6.40	6.08–6.15	6.05	.....	10.70	11.00–11.07	12.70	13.00–13.07
Chicago	.20	5.80–5.81	6.65	7.90	5.83–5.84	.....	5.95–6.00	5.95	5.83	6.81–7.025	.....	10.65	.....	12.65
Cincinnati	.20	6.13	6.72	8.21	6.14	.....	6.47	6.42	.....	7.32	.....	11.07	.....	13.07
Cleveland	.20	5.80–5.81	6.65	7.54	6.00–6.01	.....	6.12–6.17	6.28	5.89–6.04	6.91–7.10	.....	10.79	.....	12.79
Denver	.....	7.17–7.39	8.23	9.60	7.43–7.69	8.90	7.37–7.54	7.50–7.80	7.61–7.71	8.24–8.48	.....	.....	.....	.....
Detroit	.20	5.99–6.00	6.81–6.90	8.59	6.13–6.34	7.29–7.85	6.45–6.47	6.42–6.69	6.12–6.47	7.23–7.32	10.72	.....	12.72	12.42–12.92
Houston	.20	6.35–6.74	7.00–7.78	8.62–8.70	6.70–6.95	.....	6.60–6.85	6.60–6.82	6.75–7.00	9.00–9.35	11.90	11.35–11.90	13.60	13.90
Kansas City	.20	6.47	7.31	8.62	6.51	.....	6.62–6.67	6.62	6.50	7.57	.....	11.32	.....	.....
Los Angeles	.20	6.60	8.45	8.45	6.70	9.15	6.70	6.60	6.60	8.60–9.40	.....	12.05	.....	14.60
Memphis	.10	6.56	7.40	.....	6.98	.....	6.71	6.71	6.59	7.77	.....	.....	.....	.....
Milwaukee	.20	5.97–6.16	6.82	8.07	6.00–6.20	.....	6.12–6.36	6.12–6.31	6.00	7.08–7.30	.....	10.82	.....	12.52
New Orleans	.15	6.28	7.12	.....	6.32	8.32	6.43	6.43	6.31	7.85	.....	.....	.....	.....
New York	.30	6.11–6.62	7.27–7.41	8.07–8.53	6.56–6.72	8.94	6.60–6.88	6.34–6.39	6.59–6.74	7.71–7.90	10.68–10.74	10.91–11.04	12.67–12.74	12.97–13.04
Norfolk	.20	6.75	.....	.....	7.30	.....	6.65	6.65	6.55	8.30	.....	.....	.....	.....
Philadelphia	.25	6.11	7.13	7.95–8.30	6.45–6.46	.....	6.24–6.28	6.17	6.62	.....	.....	10.67–10.79	.....	12.79
Pittsburgh	.20	5.80–5.81	6.65	7.90	5.94–5.97	.....	5.95–6.00	5.95	5.83–5.98	6.66–7.12	.....	10.65	.....	12.65
Portland	.20	7.80	9.05	9.15–9.30	7.50	.....	7.05	7.25	7.25	9.40	.....	.....	.....	.....
Salt Lake City	.20	8.30	.....	10.90[3]	8.45	.....	7.85	8.00	8.40	9.35[4]	.....	.....	.....	.....
San Francisco	.15	6.90	8.20	9.50	6.75	9.25–9.70	6.75	6.50	6.65	8.40–9.40	.....	12.05	.....	14.60
Seattle	.20	7.16–7.36	8.24–8.84	9.20–9.40	7.20–7.45	.....	7.04–7.19	6.63–6.83	7.08	9.37	.....	11.70	.....	13.70
St. Louis	.20	6.10–6.11	6.94–6.95	8.20	6.14	8.27–8.39	6.35–6.40	6.35	6.13	7.21–7.43	10.65	10.95	12.65	12.95
St. Paul	.15	6.47	7.31–7.61	8.56	6.50	.....	6.61–6.66	6.61	7.57	7.32–7.57	.....	11.31	.....	.....

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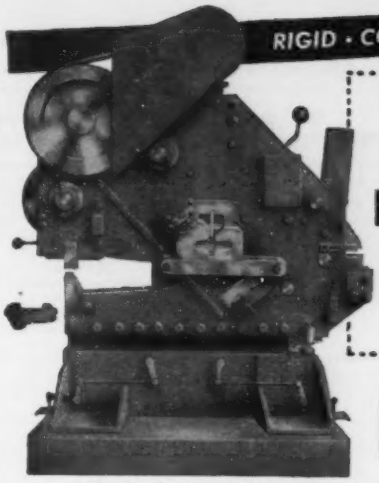

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Shears Tees	3⅛" x 5/16"	4" x ⅜"	4¾"
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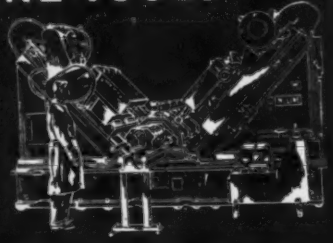

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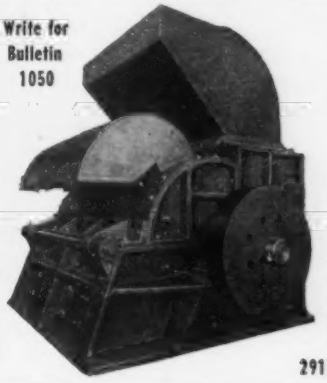

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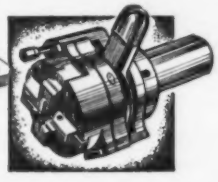

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IRON AGE

STEEL PRICES

(Effective May 19, 1953)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		INGOTS		BILLETS, BLOOMS, SLABS			PIPE SKELP	PIL-ING	SHAPES STRUCTURALS		STRIP			
		Carbon Forging Net Ton	Alloy Net Ton	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Sheet Steel	Carbon	Hi Str. Low Alloy	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy
EAST	Bethlehem, Pa.					76.00 *B3*			3.90 *B3*	5.80 *B3*				
	Buffalo, N. Y.			59.00 *B3*	70.50 *B3, R3*	76.00 *B3, R3*		4.675 *B3*	3.90 *B3*	5.80 *B3*	3.725 *B3, R3*	5.10 *B3*	5.70 *B3*	7.90 *B3*
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.				77.50 *A2*	83.00 *A2*					4.125 *A2*		5.90 *A2*	
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.			59.00 *B3*	70.50 *B3*	76.00 *B3*			3.90 *B3*	5.80 *B3*	3.725 *B3*			
	Newark, N. J.													
	New Haven, Conn.											5.60 *A5* 5.85 *D1*		
	Phoenixville, Pa.								4.95 *P2*					
	Putnam, Conn.													
	Sparrows Pt., Md.										3.725 *B3*	5.10 *B3*	5.70 *B3*	7.90 *B3*
	Worcester, Mass.													
	Trenton, N. J.											6.45 *R4*		
MIDDLE WEST	Alton, Ill.										4.20 *L1*			
	Ashland, Ky.										3.725 *A7*			
	Canton-Massillon, Ohio				70.50 *R3*	76.00 *R3* 78.60 *T5*								
	Chicago, Sterling, Ill.			59.00 *U1*	70.50 *U1, R3,W8*	76.00 *U1, R3,W8*		4.675 *U1*	3.85 *U1, W8*	5.80 *U1*	3.725 *A1,W8* 4.725 *N4*	5.35 *A1*		
	Cleveland, Ohio				70.50 *R3*							5.10 *A5, J3*		7.45 *J3*
	Detroit, Mich.	56.00 *R5*	57.00 *R5*		73.50 *R5*	79.00 *R5*					4.025 *G3* 4.40 *M2*	5.30 *G3* 5.45 *M2* 5.60 *D1* 6.05 *D2*	6.30 *G3*	8.15 *G3*
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana			59.00 *U1*	70.50 *U1*	76.00 *U1, Y1*		4.675 *I3*	3.85 *I3, U1*	5.80 *I3, U1* 6.30 *Y1*	3.725 *I3, U1, Y1*	5.35 *I3*	5.65 *I3, U1* 6.15 *Y1*	
	Granite City, Ill.													
	Kokomo, Ind.													
	Middletown, Ohio											5.10 *A7*		
	Niles, Ohio Sharon, Pa.										4.225 *S1*	5.70 *T4* 5.80 *S1*	5.65 *S1*	7.30 *S1*
	Pittsburgh, Pa. Midland, Pa.	54.00 *U1*	57.00 *U1, C11*	59.00 *U1*	70.50 *U1*	76.00 *U1, C11*	3.55 *U1* 3.65 *J3*	4.675 *U1*	3.85 *U1, J3*	5.80 *U1, J3*	3.725 *A7* 3.975 *A3* 4.225 *S7, S9*	5.10 *J3, A7* 5.45 *A3* 5.80 *B4, S7*	7.45 *J3*	
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.								4.10 *W3*		3.825 *W3*	5.10 *W3*	6.10 *W3*	7.95 *W3*
	Youngstown, Ohio					76.00 *Y1, C10*	3.55 *U1, R3*			6.30 *Y1*	3.725 *U1, Y1, R3*	5.10 *R3, Y1* 5.70 *C5* 5.80 *B4*	5.65 *R3, U1* 6.15 *Y1*	7.30 *R3* 7.80 *Y1*
WEST	Fontana, Cal.	81.00 *K1*	83.00 *K1*	78.00 *K1*	89.50 *K1*	95.00 *K1*			4.50 *K1*	6.45 *K1*	5.175 *K1*	7.00 *K1*	6.75 *K1*	
	Geneva, Utah				70.50 *C7*				3.85 *C7*	5.80 *C7*				
	Kansas City, Mo.								4.45 *S2*		4.325 *S2*			
	Los Angeles, Torrance, Cal.				89.50 *B2*	96.00 *B2*			4.45 *C7, B2*	6.35 *B2*	4.475 *C7, B2*	7.15 *C1*	6.40 *B2*	
	Minnequa, Colo.								4.30 *C6*		4.775 *C6*			
	San Francisco, Niles, Pittsburg, Cal.				89.50 *B2*				4.40 *B2* 4.56 *P9*	6.30 *B2*	4.475 *C7, B2*		6.40 *B2*	
	Seattle, Wash.				89.50 *B2, S11*	96.00 *S11*			4.50 *B2*	6.40 *B2*	4.725 *B2*		6.65 *B2*	
SOUTH	Atlanta, Ga.										4.275 *A8*			
	Fairfield, Ala. Alabama City, Ala.			59.00 *T2*	70.50 *T2*				3.85 *T2, R3*	5.80 *T2*	3.725 *T2, R3*		5.65 *T2*	
	Houston, Texas		65.00 *S2*		78.50 *S2*	84.00 *S2*			4.25 *S2*		4.125 *S2*			

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL PRICES

(Effective May 19, 1953)

SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE	
[illegible]-rolled [illegible] ga. [illegible]rgr.	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 1.25 lb. base box	Hollowware Enameling 29 ga.	
													Bethlehem, Pa.
5.275 *B3*	4.575 *B3*				5.675 *B3*	6.925 *B3*							Buffalo, N. Y.
										† Special coated mfg terne deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb deduct $2.20 from 1.25-lb coke base box. * COKES: 1.50-lb add 25¢. ELECTRO: 0.50-lb add 25¢; 0.75-lb add 65¢.			Claymont, Del.
													Coatesville, Pa.
5.25 *A2*					5.925 *A2*								Conshohocken, Pa.
													Harrisburg, Pa.
													Hartford, Conn.
									4.325 *B3*				Johnstown, Pa.
													Newark, N. J.
													New Haven, Conn.
													Phoenixville, Pa.
													Putnam, Conn.
5.075 *B3*	4.575 *B3*	5.075 *B3*			5.675 *B3*	6.925 *B3*	7.775 *B3*		4.425 *B3*	$8.80 *B3*	$7.50 *B3*		Sparrows Pt., Md.
									4.625 *A5*				Worcester, Mass.
									4.425 *R4*				Trenton, N. J.
									4.70 *L1*				Alton, Ill.
5.275 *A7*		5.075 *A7*	4.925 *A7*										Ashland, Ky.
		5.075 *R3*											Canton-Massillon, Ohio
5.275 *W8*					5.675 *U1*				4.325 *A5, N4, R3*				Chicago, Ill.
									4.425 *N4*				Sterling, Ill.
5.275 *R3, J3*	4.575 *R3, J3*		4.925 *R3*		5.675 *R3, J3*	6.925 *R3, J3*			4.325 *A5*				Cleveland, Ohio
5.975 *G3*	4.775 *G3*				6.225 *G3*	7.475 *G3*							Detroit, Mich.
													Duluth, Minn.
5.275 *I3, U1,Y1*	4.575 *I3, U1,Y1*	5.075 *I3, U1*	4.925 *U1*	5.475 *U1*	5.675 *I3, U1* 6.175 *Y1*	6.925 *I3, U1* 7.425 *Y1*				$8.70 *U1, I3,Y1*	$7.40 *U1, I3*	6.10 *U1, Y1*	Gary, Ind. Harbor, Indiana
6.30 *G2*	5.275 *G2*	5.275 *G2*	5.625 *G2*								$7.60 *G2*	6.30 *G2*	Granite City, Ill.
		5.475 *C9*											Kokomo, Ind.
	4.575 *A7*		4.925 *A7*	5.475 *A7*									Middletown, Ohio
5.175 *S1*					5.675 *S1*						$7.40 *R3*		Niles, Ohio Sharon, Pa.
5.775 *U1, J3,A7* 5.925 *A3*	4.575 *U1, J3,A7*	5.075 *U1*	4.925 *U1*		5.675 *U1, J3*	6.925 *U1, J3*	7.625 *U1*		4.325 *A5* 4.525 *P6*	$8.70 *U1, J3*	$7.40 *U1, J3*	6.10 *U1*	Pittsburgh, Pa. Midland, Pa.
									4.525 *P7*				Portsmouth, Ohio
5.775 *W3, W5*	4.575 *W3, W5*	5.075 *W3, W5*		5.475 *W3, W5*	6.025 *W3*	7.275 *W3*				$8.70 *W3, W5*	$7.40 *W3, W5*	6.35 *W5*	Weirton, Wheeling, Follansbee, W. Va.
5.775 *U1, R3,Y1*	4.575 *R3, Y1*	5.775 *R1*	4.925 *Y1*	6.05 *E2*	5.675 *R3 U1* 6.175 *Y1*	6.925 *R3* 7.425 *Y1*		5.65 *E2* 5.825 *R1*	4.325 *Y1*	$8.70 *R3*			Youngstown, Ohio
4.825 *K1*	5.675 *K1*				6.775 *K1*	7.975 *K1*			5.125 *K1*				Fontana, Cal.
2.875 *C7*													Geneva, Utah
													Kansas City, Mo.
4.475 *C7*		5.825 *C7*						5.575 *C7*	5.125 *C7, B2*				Los Angeles, Torrance, Cal.
									4.575 *C6*				Minnequa, Colo.
4.475 *C7*	5.525 *C7*	5.825 *C7*							4.975 *C7*	$9.45 *C7*	$8.15 *C7*		San Francisco, Niles, Pittsburg, Cal.
													Seattle, Wash.
													Atlanta, Ga.
3.775 *T2, R3*	4.575 *T2*	5.075 *T2, R3*			5.675 *T2*			4.925 *R3*	4.325 *T2, R3*	$8.80 *T2*	$7.50 *T2*		Fairfield, Ala. Alabama City, Ala.
									4.725 *S2*				Houston, Tex.

UNIVERSITY OF MICHIGAN LIBRARIES

STEEL PRICES

(Effective May 19, 1953)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg'l. Bright
EAST	Bethlehem, Pa.				4.675 *B3*	6.00 *B3*	5.925 *B3*					
	Buffalo, N. Y.	3.95 *B3,R3*	3.95 *B3,R3*	4.975 *B5*	4.675 *B3,R3*	6.00 *B3,B5*	5.925 *B3*	3.90 *B3*			5.95 *B3*	
	Claymont, Del.							4.35 *C4*		5.35 *C4*		
	Coatesville, Pa.							4.35 *L4*		5.75 *L4*		
	Conshohocken, Pa.							4.35 *A2*	4.95 *A2*		6.20 *A2*	
	Harrisburg, Pa.							6.50 *C3*	6.50 *C3*			
	Hartford, Conn.			4.475 *R3*		6.45 *R3*						
	Johnstown, Pa.	3.95 *B3*	3.95 *B3*		4.675 *B3*		5.925 *B3*	3.90 *B3*		5.25 *B3*	5.95 *B3*	5.225 *B3*
	Newark, N. J.			5.375 *W10*		6.35 *W10*						
	New Haven, Conn.											
	Camden, N. J.			5.375 *P10*		6.35 *P10*						
	Putnam, Conn.			5.475 *W10*								
	Sparrows Pt., Md.		3.95 *B3*					3.90 *B3*		5.25 *B3*	5.95 *B3*	5.325 *B3*
	Worcester, Mass.					6.35 *A5*						5.525 *A5*
	Trenton, N. J.											
MIDDLE WEST	Alton, Ill.	4.50 *L1*										5.45 *L1*
	Ashland, Ky.							3.90 *A7*				
	Canton-Massillon	3.95 *R3*		4.925 *R2,R3*	4.675 *R3* 4.72 *T5*	5.99 *T5* 6.00 *R2,R3*						
	Chicago, Ill.	3.95 *U1,W8, R3* 4.55 *N4*	3.95 *R3* 4.70 *N4*	4.925 *A5,B5 W8,W10*	4.675 *R3, U1, W8*	6.00 *B5,L2, R3,W8,W10* 6.05 *A5*		3.90 *U1,W8*	4.95 *U1*	5.25 *U1*	5.95 *U1*	5.225 *A3, N4,R3* 5.325 *K2* 5.475 *W7*
	Cleveland, Ohio	3.95 *R3*	3.95 *R3*	4.925 *A5,C13*		6.00 *C13* 6.05 *A5*	5.925 *R3*	3.90 *R3,J3*	4.95 *J3*		5.95 *R3,J3*	5.225 *A5, C13,R3*
	Detroit, Mich.	4.10 *R5* 4.30 *G3*		5.075 *R5,P8* 5.175 *P3* 5.125 *P5*	4.825 *R5* 5.025 *G3*	6.15 *R5,P8* 6.20 *P3, B5*	6.675 *G3*	4.45 *G3*			6.90 *G3*	
	Duluth, Minn.											5.225 *A5*
	Gary, Ind. Harbor, Crawfordsville, Indiana	3.95 *I3, U1, Y1*	3.95 *I3, U1, Y1*	4.925 *L2, M5,R3*	4.675 *I3, U1, Y1*	6.00 *L2,M5, R3,R5*	5.925 *I3, U1,* 6.425 *Y1*	3.90 *I3, U1, Y1*	4.95 *I3*	5.25 *U1*	5.95 *I3, U1,* 6.45 *Y1*	5.325 *M4*
	Granite City, Ill.							4.60 *G2*				
	Kokomo, Ind.											5.325 *C9*
	Sterling, Ill.		4.80 *N4*									5.325 *N4*
	Niles, Ohio Sharon, Pa.							4.15 *S1*		5.70 *S1*	5.95 *S1*	
	Pittsburgh, Pa. Midland, Pa.	3.95 *U1, J3*	3.95 *U1, J3*	4.925 *A5, J3, W10,R3,C8*	4.675 *U1, C11*	6.00 *C8,C11, W10* 6.05 *A5*	5.925 *U1, J3*	3.90 *U1, J3*	4.95 *U1*	5.25 *U1*	5.95 *U1, J3*	5.225 *A5, J3* 5.475 *P6*
	Portsmouth, Ohio											5.625 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.10 *W3*						3.90 *W5* 4.20 *W3*				
	Youngstown, Ohio	3.95 *U1, Y1, R3*	3.95 *U1, Y1, R3*	4.925 *F2, Y1*	4.675 *U1, C10, Y1*	6.00 *C10,F2, Y1*	5.925 *U1* 6.425 *Y1*	3.90 *U1, Y1, R3*			5.95 *R3* 6.45 *Y1*	5.225 *Y1*
WEST	Fontana, Cal.	4.65 *K1*	4.65 *K1*		5.725 *K1*		6.175 *K1*	4.55 *K1*		6.30 *K1*	6.65 *K1*	
	Geneva, Utah							3.90 *C7*			5.95 *C7*	
	Kansas City, Mo.	4.55 *S2*	4.55 *S2*		5.275 *S2*							5.825 *S1*
	Los Angeles, Torrance, Cal.	4.65 *C7,B2*	4.65 *C7,B2*	6.375 *R3*	5.725 *B2*		6.625 *B2*					6.175 *C7,B1*
	Minnequa, Colo.	4.40 *C6*	4.75 *C6*					4.70 *C6*				5.475 *C6*
	San Francisco, Niles, Pittsburg, Cal.	4.65 *C7,P9* 4.70 *B2*	4.65 *C7,P9* 4.70 *B2*				6.675 *B2*					6.175 *C6,C7*
	Seattle, Wash.	4.70 *B2, S11*	4.70 *B2, S11*		5.725 *S11*		6.675 *B2*	4.80 *B2*			6.85 *B2*	
SOUTH	Atlanta, Ga.	4.25 *A8*	4.25 *A8*									5.475 *A8*
	Fairfield, Ala. Alabama City, Ala.	3.95 *T2,R3*	3.95 *T2,R3*				5.925 *T2*	3.90 *T2,R3*			5.95 *T2*	5.225 *T2, R3*
	Houston, Texas Ft. Worth, Texas	4.35 *S2*	4.35 *S2* 5.05 *T7*		5.075 *S2*			4.30 *S2*				5.625 *S2*

Steel Prices

(Effective May 19, 1953)

Key to Steel Producers

With Principal Offices

A Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia-Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Glassport, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Co., Pittsburgh
N3 Niles Rolling Mills Co., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.

O1 Oliver Iron & Steel Co., Pittsburgh

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div. Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co. (John A.), Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sloss Sheffield Steel & Iron Co., Birmingham
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Sweet's Steel Co., Williamsport, Pa.
S11 Seidelhuber Steel Rolling Mills, Seattle

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Ft. Worth

U1 United States Steel Co., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh

Y1 Youngstown Sheet & Tube Co., Youngstown

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9-15½ ga. Col	Fence Posts Col	Single Loop Bale Ties Col	Twisted Barbless Wire Col	Galv. Barbed Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire, Galv. ¢/lb.
Alabama City *R3*†	127	135	...	132	...	144	6.075	6.325
Aliquippa, Pa. *J3*	127	141	...	...	...	148	6.075	6.525
Atlanta *A8*	130	140	...	135	...	149	6.325	6.675
Bartonville *K2*	127	139	140	132	148	148	6.075	6.50
Buffalo *W6*								
Chicago *N4*	127	136	...	132	145	145	6.375	6.925
Cleveland *A6*								
Cleveland *A5*							6.075	6.225
Crawfordsville *M4*	127	138	...	132	...	147	6.175	6.475
Donora, Pa. *A5*	127	133	...	132	142	142	6.075	6.225
Duluth *A5*	127	133	...	132	142	142	6.075	6.225
Fairfield, Ala. *T2*	127	133	...	132	142	142	6.075	6.225
Galveston *D4*	135							
Houston *S2*	135	147	...	...	...	156	6.475	6.925
Johnstn., Pa. *B3*	127	...	148	...	149	...	...	6.575
Joliet, Ill. *A5*	127	133	...	132	142	142	6.075	6.225
Kokomo, Ind. *C9*	...	...	142	...	...	...	6.175	6.425
Los Angeles *B2*							7.025	
Kansas City *S2*	139	...	...	144	...	160	6.075	7.125
Minnequa *C6*	132	146	138	137	...	153	6.325	6.70
Moline, Ill. *R3*			136					
Pittsburg, Cal. *C7*	146	156	...	156	162	162	7.025	7.175
Monessen *P6*	127	138	...	...	147	147	6.075	6.45
Portsmouth *P7*	132	...	...	...	...	...	6.47	...
Rankin, Pa. *A5*	127	133	...	...	142	142	6.075	6.225
So. Chicago *R3*†	127	135	140	132	...	144	6.075	6.325
S. San Fran. *C6*	...	...	...	153	...	167	7.025	7.40
Sparrows Pt. *B3*	129	...	...	134	151	...	...	6.675
Struthers, O. *Y1*‡	...	...	...	...	...	...	6.075	6.475
Torrance, Cal. *C7*	147	...	...	...	...	...	7.025	...
Worcester *A5*	133	...	...	...	...	...	6.375	6.525
Williamsport, Pa. *S10*	...	...	...	...	...	...	...	...

Cut Nails, carloads base $7.80 per 100 lb. (less 20¢ to jobbers) at Conshohocken, Pa. (*A2*) Wheeling, W. Va. (*W5*) $7.80.

† Zinc extra not included on Galv. Merch. Wire.

‡ Struthers Galv. Merch. Wire based on 15¢ Zinc.

STAINLESS STEELS

Base price, cents per lb., f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	15.50	16.50	18.00	17.50	26.75	21.75	23.50	13.50	16.25	13.75
Slabs, billets, rerolling	19.75	21.75	23.75	22.75	34.75	28.25	30.75	17.50	21.50	17.75
Forg. discs, die blocks, rings	36.75	37.00	39.75	38.50	57.25	43.50	48.25	30.00	30.50	30.50
Billets, forging	28.25	28.50	30.75	29.75	44.75	33.75	37.75	23.00	23.50	23.50
Bars, wires, structurals	33.75	34.00	36.50	35.50	53.00	40.00	44.75	27.50	28.00	28.00
Plates	35.75	35.75	38.00	38.00	56.00-56.25	44.00	49.00	28.75	29.75	29.25
Sheets	44.25	44.50	46.50	46.50	61.50	53.00	58.00	39.00	39.50	41.50
Strip, hot-rolled	28.50	30.50	35.00	32.75	52.50	40.00	44.50	25.00	32.75	25.75
Strip, cold-rolled	36.50	39.75	43.50	41.75	63.50	52.00	56.50	32.75	39.50	33.25

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* McKeesport, Pa., *U1;* Washington, Pa., *W2;* (type 316 add 4.5¢) *J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4;* Lockport, N. Y., *R4.*

Strip: Midland, Pa., *C11;* Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2* (type 316 add 4.5¢); W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Middletown, O., *A7;* Harrison, N. J., *D3;* Youngstown, *C5;* Lockport, N. Y., *S4;* Sharon, Pa., *S1* (type 301 add ¼¢); Butler, Pa., *A7;* Wallingford, Conn., *W1.*

Bars: Baltimore, *A7;* Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Lockport, N. Y., *S4;* Canton, O., *T5;* Ft. Wayne, *J4.*

Wires: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11.*

Plates: Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Lockport, N. Y., *S4;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3.*

Forged discs, die blocks, rings: Pittsburgh, *C11;* Syracuse, *C11;* Ferndale, Mich., *A3;* Washington, Pa., *J2.*

Forging billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11.*

WASHINGTON STEEL—Slightly lower on 300 series except where noted.

UNIVERSITY OF MICHIGAN LIBRARIES

Miscellaneous Prices

(Effective May 19, 1953)

PIPE AND TUBING

Base discounts f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS					
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½–3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																				
Sparrows Pt. *B3*	30.5	8.25	33.5	12.25	35.5	15.75	36.5	16.25	37.0	17.25	37.5	17.75	38.0	18.25	.....	.....	.....	.....	.....	.....
Youngstown *R3*	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	.....	.....	.....	.....	.....	.....
Fontana *K1*	19.5	+2.75	22.5	1.25	25.0	4.75	25.5	5.25	26.0	6.25	26.5	6.75	27.0	7.25	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	32.5	10.25	35.5	13.25	38.0	15.75	38.5	16.75	39.0	17.25	39.5	17.75	40.0	18.75	24.0	2.25	27.0	5.75	29.0	7.75
Alton, Ill. *L1*	31.5	9.25	34.5	13.25	37.0	16.75	37.5	17.25	38.0	18.25	38.5	18.75	39.0	19.25	.....	.....	.....	.....	.....	.....
Sharon *M3*	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	24.0	.....	27.0	.....	29.0	.....
Wheeling *W5*	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	.....	.....	.....	.....	.....	.....
Wheatland *W4*	32.5	10.25	35.5	13.25	38.0	15.75	38.5	16.75	39.0	17.25	39.5	17.75	40.0	18.75	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	24.0	3.75	27.0	6.75	29.0	8.75
Indiana Harbor *Y1*	31.5	9.25	34.5	13.25	37.0	16.75	37.5	17.25	38.0	18.25	38.5	18.75	39.0	19.25	.....	.....	.....	.....	.....	.....
Lorain *N2*	32.5	15.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	24.0	3.75	27.0	6.75	29.0	8.75
EXTRA STRONG PLAIN ENDS																				
Sparrows Pt. *B3*	30.25	9.5	34.25	13.5	36.25	17.0	36.75	17.5	37.25	18.5	37.75	19.0	38.25	19.5	.....	.....	.....	.....	.....	.....
Youngstown *R3*	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5	.....	.....	.....	.....	.....	.....
Fontana *K1*	19.25	.....	23.25	.....	25.25	.....	25.75	.....	26.25	.....	26.75	.....	27.25	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	32.25	10.0	36.25	14.0	38.25	16.0	38.75	17.0	39.25	17.5	39.75	18.0	40.25	19.0	23.75	2.0	27.75	6.5	31.25	10.0
Alton, Ill. *L1*	29.25	8.5	33.25	12.5	35.25	16.0	35.75	16.5	36.25	17.5	36.75	18.0	37.25	18.5	.....	.....	.....	.....	.....	.....
Sharon *M3*	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5	23.75	.....	27.75	.....	31.25	.....
Wheeling *W5*	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5	.....	.....	.....	.....	.....	.....
Wheatland *W4*	32.25	10.0	36.25	14.0	38.25	16.0	38.75	17.0	39.25	17.5	39.75	18.0	40.25	19.0	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	32.25	11.5	36.25	15.5	37.75	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	22.5	23.75	4.5	27.75	8.5	31.25	12.0
Indiana Harbor *Y1*	31.25	10.5	35.25	14.5	37.25	17.5	37.75	18.5	38.25	19.5	38.75	20.0	39.25	20.5	.....	.....	.....	.....	.....	.....
Lorain *N2*	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5	23.75	4.5	27.75	8.5	31.25	12.0

Galvanized discounts based on zinc, at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb. of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes by 1¢. Threads only buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3¾ pts. higher discount. Buttweld jobbers' discount, 5 pct. St. Louis zinc price now 11.0¢.

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$14.50 to $15.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$16.50 to $18.00
Foundry, oven coke	
Buffalo, del'd	$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.00
Philadelphia, f.o.b.	23.95
Swedeland, Pa., f.o.b.	23.85
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.43
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, del'd	23.21
Lone Star, Tex., f.o.b.	18.50

ELECTRICAL SHEETS

22 Ga. H-R cut length F.o.b. Mill Cents Per Lb.	Armature	Elec.	Meter	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beach Bottom *W5*	.....	7.85	9.10	9.90	10.45	11.00	11.70
Brackenridge *A3*	7.35	7.85	9.10	9.90	10.45	11.00	11.70
Granite City *G2*	.....	8.55	9.80	.....	.....	.....	.....
Ind. Harbor *I3*	7.35	7.85	9.10	.....	.....	.....	.....
Mansfield *E2*	7.35	7.85	9.10	9.90	.....	.....	.....
Newport, Ky. *N5*	7.35	7.85	9.10	9.90	10.45	.....	.....
Niles, O. *N3*	7.35	7.85	.....	.....	.....	.....	.....
Vandergrift *U1*	7.35	7.85	9.10	9.90	10.45	11.00	11.70
Warren, O. *R3*	7.35	7.85	9.10	.....	.....	.....	.....
Zanesville *A7*	7.35	7.85	9.10	9.90	10.45	11.00	11.70

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$110.30 to $113.80
6 to 24-in., del'd N.Y.	113.50 to 114.80
6 to 24 in., Birmingham	96.50 to 101.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	$128.00 to $130.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	23.93	28.14	23.19	27.28
	2½	12	32.17	37.83	31.19	36.67
	3	12	35.78	42.11	34.68	40.82
	3½	11	44.72	52.65	43.36	51.05
	4	10	55.52	65.31	63.83	63.32
National Tube	2	13	22.81	27.94	22.23	.....
	2½	12	31.28	38.31	30.51	.....
	3	12	35.87	43.93	34.98	.....
	3½	11	42.56	52.12	.....	.....
	4	10	54.02	66.16	.....	.....
Pittsburgh Steel	2	13	.....	28.58	.....	.....
	2½	12	32.16	36.19	.....	.....
	3	12	36.87	44.93	.....	.....
	3½	11	43.76	53.32	.....	.....
	4	10	.....	67.68	.....	.....

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	Bl. Furnace Silvery
Bethlehem *B3*	56.50	57.00	57.50	58.00	.....	.....
Birmingham *R3*	50.88	51.38	.....	.....	.....	.....
Birmingham *W9*	50.88	51.38	.....	.....	.....	.....
Birmingham *S3*	50.88	51.38	.....	.....	.....	.....
Buffalo *R3*	54.50	55.00	55.50	.....	.....	.....
Buffalo *H1*	54.50	55.00	55.50	.....	.....	66.75
Buffalo *W6*	54.50	55.00	55.50	.....	.....	.....
Chicago *I4*	54.50	55.00	55.00	55.50	.....	.....
Cleveland *A5*	54.50	55.00	55.00	55.50	59.50	.....
Cleveland *R3*	54.50	55.00	55.00	.....	.....	.....
Daingerfield, Tex. *L3*	50.50	51.00	51.00	.....	.....	.....
Duluth *I4*	54.50	55.00	55.00	55.50	.....	.....
Erie *I4*	54.50	55.00	55.00	55.50	.....	.....
Everett, Mass. *M6*	.....	59.50	60.00	.....	.....	.....
Fontana *K1*	60.50	61.00	.....	.....	.....	.....
Geneva, Utah *C7*	54.50	55.00	.....	.....	.....	.....
Granite City, Ill. *K3*	56.40	56.90	57.40	.....	.....	.....
Hubbard, Ohio *Y1*	54.50	55.00	55.00	.....	.....	.....
Jackson, Ohio *J1,G1*	.....	.....	.....	.....	.....	65.50
Minnequa *C8*	56.50	57.50	57.50	.....	.....	.....
Monessen *P8*	56.50	.....	.....	.....	.....	.....
Neville Island *P4*	54.50	55.00	55.00	55.50	.....	.....
Pittsburgh *U1*	54.50	.....	.....	55.50	.....	.....
Sharpsville *S3*	54.50	55.00	55.00	55.50	.....	.....
Steelton *B3*	56.50	57.00	57.50	58.00	62.50	.....
Swedeland *A2*	58.50	59.00	59.50	60.00	.....	.....
Toledo *I4*	54.50	55.00	55.00	55.50	.....	.....
Troy, N. Y. *R3*	56.50	57.00	57.50	58.00	62.50	.....
Youngstown *Y1*	54.50	55.00	55.00	55.50	.....	.....
N. Tonawanda, N. Y. *T1*	.....	55.00	55.50	.....	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 pct and over. Silvery Iron: Add $1.50 per ton net for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

C-R SPRING STEEL

Cents Per Lb. F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bridgeport, Conn. **S7*	5.80	7.65	8.25	10.20	12.50
Carnegie, Pa. *S9*	.....	7.65	8.25	10.20	12.50
Cleveland *A5*	5.10	7.30	8.25	10.20	12.50
Detroit *D1*	6.45	7.50	8.10	.....	.....
New Castle, Pa. *B4*	5.80	7.65	8.25	10.20	.....
New Haven, Conn. *D1*	6.70	7.40	8.20	.....	.....
Sharon, Pa. *S1*	5.80	7.65	8.25	10.20	12.50
Trenton, N. J. *R4*	.....	7.95	8.55	10.50	12.80
Warren, Ohio *T4*	6.20	7.45	8.25	10.20	12.50
Weirton, W. Va. *W3*	5.80	7.65	8.25	10.20	12.50
Worcester, Mass. *A5*	5.40	7.60	8.55	10.50	12.80
Youngstown *C5*	.....	7.65	8.25	10.20	12.50

* Sold on Pittsburgh base.

Miscellaneous Prices

(Effective May 19, 1953)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	4.075	5.00	5.075				
Chicago *R3*				6.65			
Cleveland *R3*							
Colder *T2*	4.075	5.00					
Fairfield *T2*		5.00		6.65		4.925	
Gary *U1*	4.075	5.00				4.925	
Ind. Harbor *I3*	4.075		5.075	6.80		4.925	
Johnstown *B3*		4.55					
Joliet *U1*		5.00	5.075				
Kansas City *S2*							
Lackawanna *B3*	4.075	4.55	5.075			4.925	
Lebanon *B3*				6.80			
Minnequa *C6*	4.075	5.05	5.075	6.80		4.925	10.00
Pittsburgh *R3*							
Pittsburgh *O1*							
Pittsburgh *P5*							
Pittsburgh *J3*				6.65			
Pitts., Cal. *C7*						5.075	
Seattle *B2*				7.30		5.075	
Steelton *B3*	4.075		5.075			4.925	
Struthers *Y1*				6.65			
Torrance *C7*						5.075	
Youngstown *R3*				6.65			

TOOL STEEL

F.o.b. mill

Add 4.7 pct to base and extras.

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.505
18	4	1	—	5	$2.13
18	4	2	—	—	$1.65
1.5	4	1.5	8	—	31.0¢
6	4	2	6	—	96.5¢

High-carbon chromium ..... 63.5¢
Oil hardened manganese ..... 35¢
Special carbon ..... 32.5¢
Extra carbon ..... 27¢
Regular carbon ..... 23¢

Warehouse prices on and east of Mississippi are 3.5¢ per lb. higher. West of Mississippi, 5.5¢ higher.

CLAD STEEL

Add 4.7 pct to base and extras.

Stainless-carbon	Plate	Sheet
No. 304, 20 pct		
Coatesville, Pa. *L4*	*29.5	
Washington, Pa. *J2*	*29.5	
Claymont, Del. *C4*	*29.50	
Conshohocken, Pa. *A2*		*27.50
New Castle, Ind. *I2*	*29.77	*26.74
Nickel-carbon		
10 pct Coatesville, Pa. *L4*	32.5	
Inconel-carbon		
10 pct Coatesville, Pa. *L4*	40.5	
Monel-carbon		
10 pct Coatesville, Pa. *L4*	33.5	
No. 302 Stainless copper stainless, Carnegie, Pa. *A4*		77.00
Aluminized steel sheets, hot dip, Butler, Pa., *A7*		7.75

*Includes annealing and pickling, ‡ sandblasting.

ELECTRODES

Cents per lb, f.o.b., plant threaded electrodes with nipples, unboxed

Diam. in In.	Length in In.	Cents Per lb.
	GRAPHITE	
24	84	18.70
17, 18, 20	60, 72	18.70
8 to 16	48, 60, 72	18.70
7	48, 60	20.50
6	48, 60	21.95
4, 5	40	22.53
3	40	23.68
2½	24, 30	24.26
2	24, 30	26.57
	CARBON	
40	100, 110	8.45
35	65, 110	8.45
30	65, 84, 110	8.45
24	72 to 104	8.45
20	84, 90	8.45
17	60, 72	8.45
14	60, 72	9.02
10, 12	60	9.30
8	60	9.58

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; Effective CaF_2 content:

72½% $44.00
70% or more 42.50
60% or less 38.00

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Nuts, Hot Pressed, Cold Punched—Sq.

	Pct Off List Less Keg Reg.	K.	Less Keg Hvy.	K.
½ in. & smaller.	10	24	10	24
9/16 in. & ⅝ in.	8	21	1	16
¾ in. to 1½ in. inclusive	4	18	+4	12
1⅝ in. & larger.	2	17	+4	12

Nuts, Hot Pressed—Hexagon

½ in. & smaller.	22	33	18	30
9/16 in. & ⅝ in.	12	25	1	16
¾ in. to 1½ in. inclusive	8	21	+3	13
1⅝ in. & larger.	4	18	+3	13

Nuts, Cold Punched—Hexagon

½ in. & smaller.	22	33	18	30
9/16 in. & ⅝ in.	19	31	13	26
¾ in. to 1½ in. inclusive	15	27	8	21
1⅝ in. & larger.	2	17	+4	12

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller.	33	43	26	37
9/16 in. & ⅝ in.	27	38	19	31
¾ in. to 1½ in. inclusive	21	33	11	25
1⅝ in. & larger.	5	19	net	15
		Light		
7/16 in. & smaller	33	43		
½ in. thru ⅝ in.	26	37		
¾ in. to 1½ in. inclusive	18	30		

Stove Bolts *Pct Off List*

Packaged, steel, plain finished 44½—10
Packaged, plain finish ..... 25½—10
Bulk, plain finish** 59*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Inc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets *Base per 100 lb*

½ in. & larger $8.50

Pct Off List

7/16 in. and smaller 30

Cap and Set Screws

(In bulk) *Pct Off List*

Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	40
¼ in. thru 1 in. up to & including 6 in.	26
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	43
¾ in. thru 1 in. up to & including 6 in.	33
Milled studs	17
Flat head cap screws, listed sizes ...	12
Fillister head cap, listed sizes	7
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	37

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	11	25
9/16 in. & ⅝ in. x 6 in. & shorter	15	27
¾ in. & larger x 6 in. & shorter	14	26
All diam. longer than 6 in...	8	22
Lag, all diam. x 6 in. & shorter	19	31
Lag, all diam. longer than 6 in.	16	28
Plow bolts	30	..

REFRACTORIES

Fire Clay Brick *Carloads, per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.25) .. $99.30
No. 1 Ohio 92.40
Sec. quality, Pa., Md., Ky., Mo., Ill. .. 92.40
No. 2 Ohio 83.15
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.60) 14.40

Silica Brick

Mt. Union, Pa., Ensley, Ala. $99.30
Childs, Pa. 103.95
Hays, Pa. 105.10
Chicago District 122.40
Western Utah 116.55
California 122.85
Super Duty, Hays, Pa., Athens, Tex., Chicago 116.65
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) 17.30
Silica cement, net ton, bulk, Hayes, Pa. 19.60
Silica cement, net ton, bulk, Ensley, Ala. 18.45
Silica, cement, net ton, bulk, Chicago District 18.45
Silica cement, net ton, bulk, Utah and Calif. 25.95

Chrome Brick *Per net ton*

Standard chemically bonded Balt., Chester $86.00
Burned, Balt., Chester 80.00

Magnesite Brick

Standard Baltimore $109.00
Chemically bonded, Baltimore 97.50

Grain Magnesite *St. ⅝-in. grains*

Domestic, f.o.b. Baltimore in bulk fines removed $64.40
Domestic, f.o.b. Chewalah, Wash., in bulk 38.00
in sacks 43.70

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢ ... $13.75

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices through June 30, 1953, delivery.

Gross Ton

Openhearth lump $10.95
Old range, bessemer 10.10
Old range, nonbessemer 9.95
Mesabi, bessemer 9.85
Mesabi, nonbessemer 9.70
High phosphorus 9.70

Prices based on upper Lake rail freight rates, Lake vessel freight rates, handling and unloading charges, and taxes thereon, in effect on Dec. 31, 1952. Increases or decreases after such date are for buyer's account.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags ... 10.9¢
Canadian sponge iron, del'd. in East ..... 12.0¢
Domestic sponge iron, 98+% Fe, carloads lots ..... 15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+% Fe ..... 44.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe 60.0¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe 53.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe 83.0¢ to $1.48
Aluminum ..... 31.5¢
Brass, 10 ton lots ..... 30.00¢ to 33.25¢
Copper, electrolytic 10.75¢ plus metal value
Copper reduced ... 10.00¢ plus metal value
Cadmium, 100-199 lb. 95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity, del'd ... $3.50
Lead ..... 7.5¢ to 12.0¢ plus metal value
Manganese ..... 57.0¢
Molybdenum, 99% $2.75
Nickel, unannealed ..... 88.0¢
Nickel, annealed ..... 95.0¢
Nickel, spherical, unannealed 92.0¢
Silicon ..... 33.5¢
Solder powder .. 7.0¢ to 9.0¢ plus met. value
Stainless steel, 302 ..... 83.9¢
Stainless steel, 316 ..... $1.10
Tin ..... 14.04¢ plus metal value
Tungsten, 99% (65 mesh) .. $5.50
Zinc, 10 ton lots ..... 23.0¢ to 30.5¢

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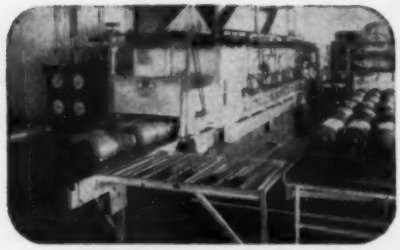
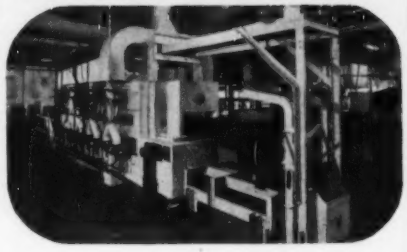


Compressed gas cylinders or tanks are continuously normalized and annealed—scale-free in EF gas fired furnaces.



Bolts, springs and other products are scale-free heat treated in EF continuous chain belt conveyer furnaces. 11 sizes—to handle from 125 to 2000 lbs. more per hour.

EF PRODUCTION FURNACES

for these and other processes

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—Ferroalloy Prices—

(Effective May 19, 1952)

Ferrochrome

Contract prices, cents per pound, contained CR, lump size, bulk in carload delivered. (65-72% Cr, 2% max. Si.)

0.06% C	34.50	0.20% C	33.5
0.10% C	34.00	0.50% C	33.5
0.15% C	33.75	1.00% C	33.0
2.00% C			32.7
65.69% Cr, 4-9% C			24.7
62-66% Cr, 4-6% C, 6-9% Si			25.0

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	35.0
Ton lots	38.0
Less ton lots	39.5

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.15
0.50% max. C	1.16
9 to 11% C	1.11

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 25.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.

Bulk 1-in. x down, 25.90¢ per lb contained Cr plus 12.60¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.10
Less ton lots	23.30

CMSZ

Contract price, cents per lb of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	20.75
Less ton lots	22.00

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50
Less ton lots	17.75

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00
Ton lots to carload packed	19.00
Less ton lots	20.50

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size.

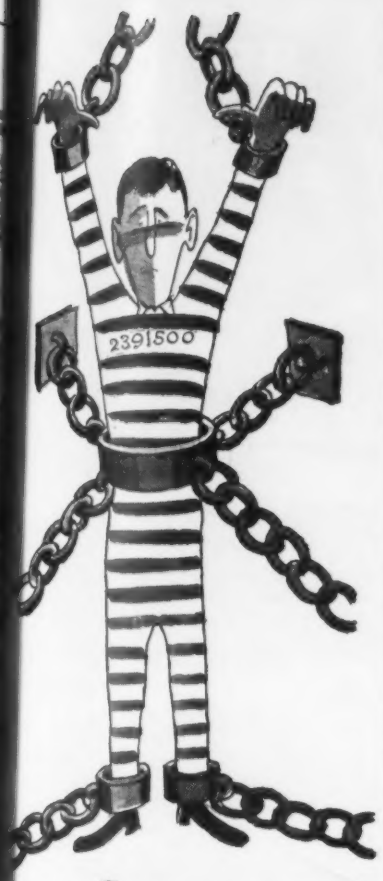
F.o.b. Niagara Falls, Alloy, W. Va., Ashtabula, O.	$225
F.o.b. Johnstown, Pa.	227
F.o.b. Sheridan, Pa.	225
F.o.b. Philo, Ohio	225

Add $2.80 for each 1% above 82%, subtract $2.80 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	12.45
Ton lots, packed	14.05
F.o.b. Etna, Clairton, Pa., per net ton	$200

Add $2 for each 1% above 76%, subtract $2 for each 1% below 74%.



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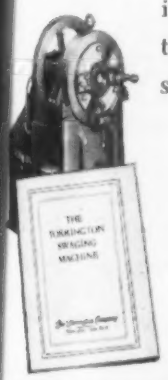

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THE TORRINGTON COMPANY
Swager Department
555 Field Street • Torrington, Conn.

Makers of
TORRINGTON NEEDLE BEARINGS

Ferroalloy Prices

(Effective May 19, 1953)

Spiegeleisen

Contract prices gross ton; lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$84.00	$85.00
Pgh. or Chicago	84.00	85.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
96% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	36.95
Ton lots	38.45

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	30.00
Ton lots	32.00
Less ton lots	34.00 to 37.00
Premium for hydrogen-removed metal	1.50

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	28.45	30.30	31.50
0.07% max. C	27.95	29.80	31.00
0.15% max. C	27.45	29.30	30.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn.....21.35¢

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.40
Ton lots	13.05
Briquet contract basis carlots, bulk delivered, per lb of briquet	12.65
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $95.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00. Add $1.055 per ton for each additional 0.50% Si up to and including 17%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	18.00
97% Si, 1% Fe	18.50

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.95
Ton lots	8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.30
50% Si	12.40	85% Si	15.55
90.95% Si			17.00

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

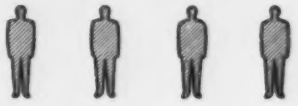
	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

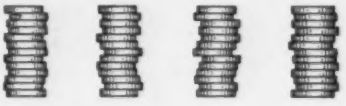
35-55% contract basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

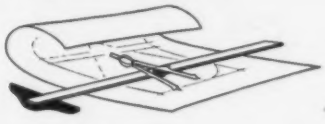
Naturally you demand a contractor with . . .



MEN
with plenty of experience in building construction and installation of industrial machinery.



MONEY
all it takes to assure unquestioned responsibility to see any job through to completion.



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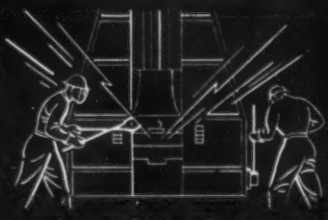

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Braddock, Thomas & Meade Sts.

Pittsburgh 8, Pa.

Ferroalloy Prices

(Effective May 19, 1953)

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
- Carloads 9.90
- Ton lots 11.30

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.15

Ferrocolumbium, 50-60% 2 in. x D contract basis, delivered per pound contained Cb.
- Ton lots $4.90
- Less ton lots 4.95

Ferro-Tantalum-Columbium, 20% Ta, 40% Cb, 0.30% C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $3.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.32

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
- 10 tons to less carload..... $75.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.35

Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.50
- Less ton lots..... 1.55

Ferrotitanium, 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton..... $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, f.o.b..... $4.45

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. $1.14
- bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
- Carload, bulk lump..... 14.50¢
- Ton lots, bulk lump..... 15.75¢
- Less ton lots, lump..... 16.25¢

Vanadium Pentoxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.28

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
- Ton lots ..... 21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
- Carload, bulk ..... 7.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B.... $5.25

Bortam, f.o.b. Niagara Falls
- Ton lots, per pound..... 45¢
- Less ton lots, per pound.... 50¢

Corbortam, Ti, 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed.
- ton lots, per pound..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots.... $1.20
- F.o.b. Wash., Pa.; 100 lb up
- 10 to 14% B..... .85
- 14 to 16% B..... 1.20
- 19% min. B..... 1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.
- No. 1 ..... $1.00
- No. 6 ..... 68¢
- No. 79 ..... 50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
- Ton lots $1.46
- Less ton lots..... 1.57

Nickel - Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered
- Less ton lots..... $1.30

Silcaz, contract basis, delivered.
- Ton lots ..... 45.00¢

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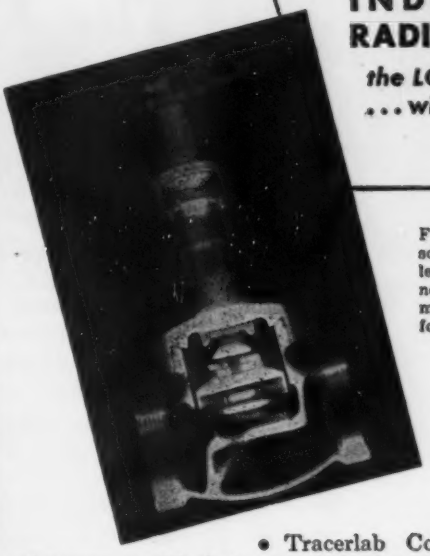

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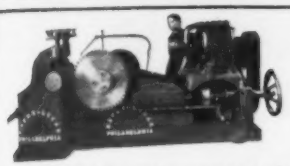

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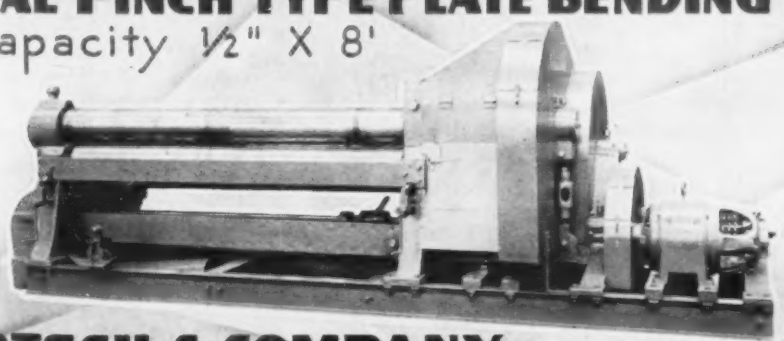

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Qu.	H.P.	Make	Type	Volts	RPM
1	2200	G.E.	MCF	600	400/500
1	2000	Whse.	Mill	600	230/460
1	940	Whse.	QM	250	140/170
1	900	Whse.		250	450/550
1	800	Al. Ch.		250	400/800
1	500	Whse.	CC-216	600	300/900
2	450	Whse.		550	415
1	400	G.E.	MCF	550	300/1050
2	300	Whse.	CB-5004	230	575/1150
1	300/300	G.E.	MPC	230	360/920
1	200	Rel.	1970T	230	720
1	200	Whse.	CB-5118	230	400/800
1	150	Whse.	CB-3078	230	575/1150
1	150	G.E.		600	250/750
1	150	Cr. Wh.	65H	230	1150
8	150	Cr. Wh.	83H-TEFC	230	900
1	150	Whse.	8K-151B	230	900/1800
1	150	Whse	8K-201	230	380/950
1	50/120	G.E.	MCF	230	250/1000
2	100	Whse.	8K-181	230	450/1000
1	100	G.E.	CDP-115	230	1750

MILL & CRANE

1	50	G.E.	CO-1810	230	725
1	20	Whse.	K-5	230	975
4	15	Whse.	K-5	230	630
8	10	C.W.	8CM-AH	230	1150
1	10	G.E.	MD-104	230	400/800
8	6.25	Whse.	K-3	230	680
4	3	C.W.	8CM-FF	230	1750
2	3	Whse.	HK-2	230	835

A.C. MOTORS

3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1800	G.E.	MT-498	2300	360
1	1500	ABB		2300	720
1	1200	G.E.	MF-24	2300	275
2	1000	A.C.	Mill	2300	240
1	800	Whse.	CW	550	350
1	500	G.E.	IM	440	900
1	800	G.E.	M-574-Y	6600	900
1	400	Whse.	CW	440	514
1	400	Whse.	CW-1218	2200	435
1	350	G.E.	MT-442Y	2300/4000	253
3	300	G.E.	MT-565Y	2300	900
1	300	A.C.	3-Brg	440	585
1	250	G.E.	MT-424-Y	4000	257
1	250	G.E.	MT-5598	2300	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	26QB	440	585
1	200	G.E.	IM-17	440	600
1	200	G.E.	IM	440	435
1	200	G.E.	MTP	440	1170
1	150(unused)	Whse.	CW	2300	435
1	150	G.E.	IM-16	440	600
2	125	A.C.		440	865
1	125	Al. Ch.		440	720
4	125	G.E.	MT-566Y	440/2200	435
1	100	G.E.	IM	440	600
5	100	A.C.	ANY	440	695
1	100	G.E.	IM-16	2300	435
1	100	Whse.	CW-868A	440	700

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2	650	G.E.	FT-559BY	440	8570
2	450	Whse.	CS-1420	2300/4150	854
1	300	G.E.	IK-17	440	580
1	200	G.E.	IK	440	885
8	200	G.E.	KT-557	440	1800
1	150	Whse.	CS-856B	440	880
1	150	Whse.	CS	440	580
1	150/75	G.E.	IK	440 900/450	
2	125	Al. Ch.	ARW	2300	1750
1	125	G.E.	KF-6528-Z	440/2300	3585
1	125	Whse.	MS	440	485

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2	8500	G.E.	TS	2300	257
2	2100	G.E.	ATI	2300	360
2	1750	G.E.	ATI	2300	3600
2	3000	Whse.		2300	120
3	735	G.E.	ATI	2300/12000	600
1	450	Whse.		2300	450
2	350	G.E.	TS	2300	156

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Qu.	K.W.	Make	RPM	D.C. Volts	A.C. Volts
1	3000	G.E.	500	600	11000
1	3000	G.E.	514	600	6600/13200
8	1500	G.E.	514	250	6600/13200
1	1500	G.E.	720	600	6600/13200
1	1500	G.E.	360	275	4160
1	1500	G.E.	600	600	4160
1	1800	C.W.	514	115	4000/13000
2	1000	Whse.	900	600	4160
1	1000	G.E.	900	280	6600
1	1000(SU)	G.E.	900	250	2300
1	750	Whse.	900	275	4160
1	750	C.W.	514	115	2300
1	600	G.E.	720	250	440/2300
1	500	G.E.	720	125	2300
1	500	Whse.	900	125/250	440
1	500	Whse.	900	250	6600/13200
1	500	Whse.	1200	125/250	2300
1	400	Whse.	1200	250	2300
1	400(SU)	Cr. Wh.	1200	125/250	2300
1	150	Whse	1200	275	2300
1	140(SU)	Cr. Wh.	600	125/250	440/2300
1	100	Delco	1200	120/240	2300
1	100	G.E.	1170	125	220/440

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Qu.	KW	Make	Freq.	Voltages
1	3000	G.E.	25/60	2300/2300/4000
2	2500	G.E.	25/62.5	2300/2300
1	1000	G.E.	25/58.3	4600/2300
1	500	Al. Ch.	3500	11000/2300

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The Clearing House

NEWS OF USED AND REBUILT MACHINERY

Business Is Better . . . Used machinery men around Pittsburgh report a mild pickup in demand for steel mill equipment and say inspections have become more numerous. Business is described as fair-to-good.

One dealer says he has had encouraging results from circularizing foreign prospects and reports that this approach has resulted in some promising contracts. The watchword on exports, however, is patience. Most inquiries don't turn into deals, but the few that do come through more than justify the effort.

Just Seems Like More . . . Machine tool business is reported to be good, but one exasperating aspect is the duplication of inquiries from firms apparently bidding for the same defense contract. As a result of this, business prospects appear to be better than they really are.

Pittsburgh dealers have noted that there is an increase in the number of auctions throughout the country. Their impression is that larger and larger crowds are flocking to these sales and that equipment is going for comparatively high prices.

Cost Too Much . . . One used machine tool man in the area went to an auction recently planning to spend some money but came back empty-handed.

The reason: Bids were double what he had originally intended to spend.

The recent flush of renewed interest in auctions is a result of greater availability of late model equipment, dealers say. But it has also been noted that pre-1940 machines that formerly went begging are now being snapped up.

Some observers do not expect the current tight market on good used equipment to continue too much longer. They believe more good machinery will be placed on the market by smaller companies as larger concerns cut down on the volume of subcontracting work that is handed out.

Want Toolroom Units . . . Strongest demand in the Pittsburgh market centers around toolroom equipment, late-model lathes, large milling machines and surface grinders. Since manufacturers of standard and general purpose radial drills appear to have leveled their order backlogs considerably, demand for used machines of this type has tailed off recently in the Pittsburgh area.

Electrical equipment dealers report business is still in the doldrums.

Keeps Mill Equipment . . . Albert Curry & Co., Inc., Pittsburgh, has leased space in nearby McKees Rocks, Pa., which will be used for reconditioning and warehousing steel mill equipment. The Curry company is believed to be the only dealer organization in this type of equipment to maintain steel mill machinery on a readily available warehouse basis.

The plan is to build up a stock of primary and accessory equipment for ready availability to would-be purchasers. Advantage lies in having a varied stock in a central location for inspection and shipment. Both rail and truck shipments can be made.

Anyone Can Go . . . Used machinery dealers who are not members of the Machinery Dealers National Assn. will have an opportunity to find out first hand about the association's many efforts to strengthen the industry at the MDNA's 12th annual convention in Cleveland, June 9-10.

For the first time, MDNA is permitting non-members to attend its general meetings, luncheons, cocktail parties and banquet. Featured speaker at the forthcoming convention is Swan Bergstrom, president, National Machine Tool Builders' Assn.